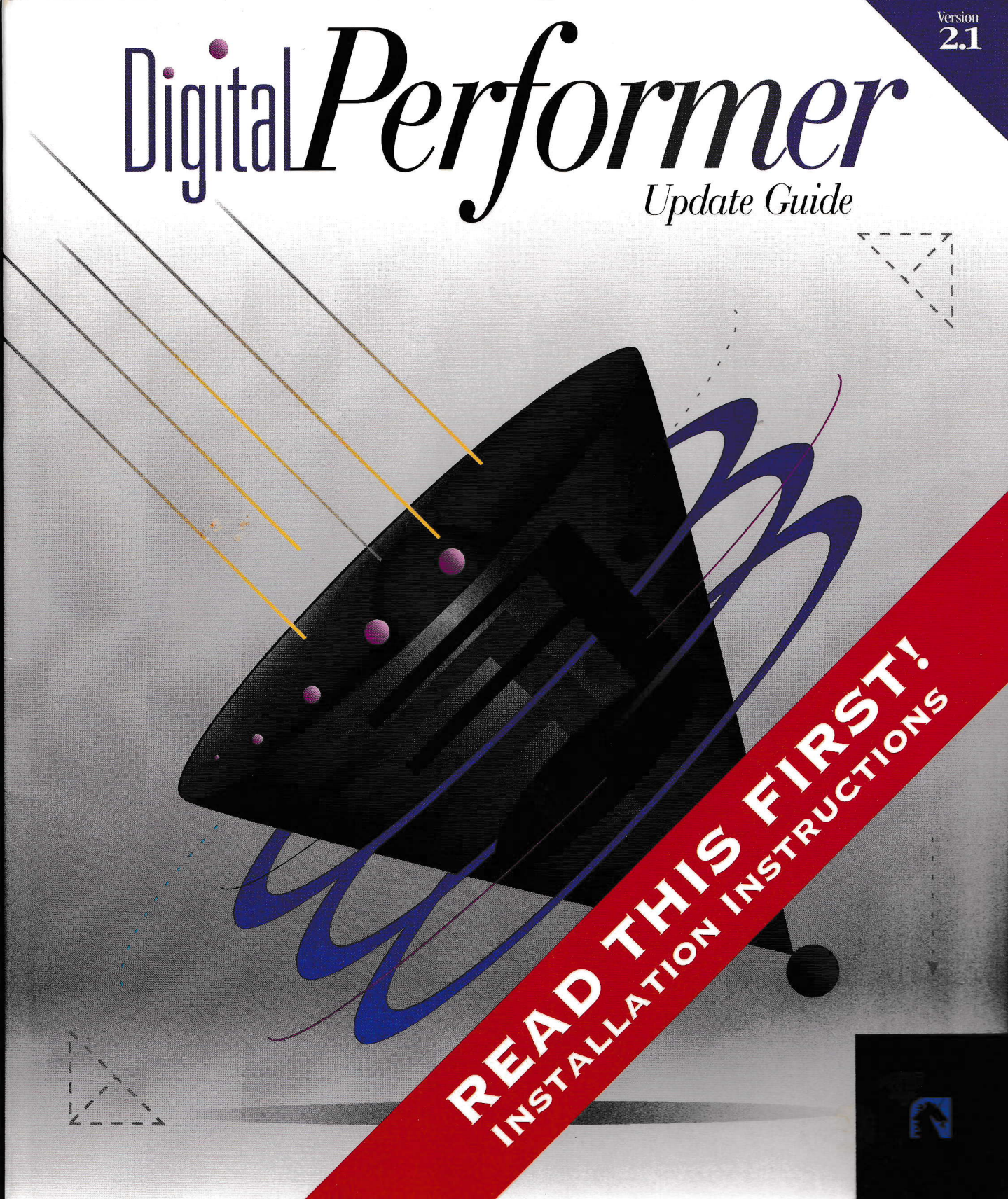
Version 2.1

Digital Performer

Update Guide



READ THIS FIRST!

INSTALLATION INSTRUCTIONS

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Digital Performer
Version 2.1
Installation Guide and Update Notes

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CHAPTER 1 Start Here! Digital Performer® 2.1 Installation Guide

Welcome to Digital Performer! Mark of the Unicorn is pleased to present you with our award-winning sequencing and digital audio recording software for Macintosh.

ABOUT THIS GUIDE

This guide provides important information about the latest version of Digital Performer not found in the other manuals. It also tells you how to successfully install Digital Performer.

IMPORTANT! REGISTER YOUR SOFTWARE

Before you go any further, take a moment to register your new Digital Performer software as described in the section below that applies to you. Doing so entitles you to:

- A free backup authorization disk (if applicable)
- Free, unlimited technical support
- Free newsletters, software updates, and announcements about major software upgrades and new products

Since Mark of the Unicorn can only provide customer service and technical support to registered users, please be sure to send the card in immediately after purchase.

If you received this version as a free update

If you received this version of Digital Performer as a free update from a recent earlier version, you are already registered as a Digital Performer user with your original Performer registration and serial number. Keep your original Performer manual with the registration card page inside the front cover for your future reference.

If you purchased this version as a major upgrade directly from Mark of the Unicorn

You are already registered as a Digital Performer user with your original Performer registration and serial number. Keep your original Performer manual with the registration card page inside the front cover for your future reference. You may also want to write down the serial number in your copy of the Digital Performer *Guide to Digital Audio* manual.

If you purchased this version as a major upgrade through your dealer

You will be registered when the dealer returns your upgrade coupon to Mark of the Unicorn. We will acknowledge its receipt by mailing you a backup authorization disk, along with your new Digital Performer registration number.

If you purchased Digital Performer

Take a moment now to fill in and mail the registration card found at the beginning of the Digital Performer *Guide to Digital Audio*, which accompanies this booklet. Leave the rest of the cardboard page in the manual for your future reference.

SYSTEM REQUIREMENTS

Digital Performer 2.1 requires a 68040-based Macintosh or faster with 20Mb of RAM or more and System 7.1 or higher. However, this configuration will not be able to play and record audio under Sound Manager (see below).

Requirements for Sound Manager audio

If you would like to play and record audio tracks in Digital Performer using Sound Manager and your Macintosh built-in sound capabilities, you need a Power Macintosh with at least 24Mb of RAM running System 7.5 or higher. At least 32Mb or RAM is recommended.

Sound Manager 3.2.1 and another System Extension called *SOMobjects* are also required for native audio recording and playback, but both of them are included with Digital Performer.

Requirements for Digidesign systems

If you would like to use Digital Performer with a Digidesign hard disk recording system such as Pro Tools or Audiomedia, Digital Performer will run on any Macintosh (68K or PowerPC) that is compatible with your Digidesign audio hardware. Please contact Digidesign (or visit their web site) for information about the compatibility of their hardware with specific Macintosh models.

System software requirements

Digital Performer requires at least System 7.1. For Sound Manager audio, Digital Performer requires System 7.5 or higher. 32-bit memory addressing must be enabled. System 7.6 is recommended. If your Mac is not 32-bit clean, the Digital Performer installer will automatically install MODE32 or the 32-bit Enabler, whichever is correct for your Mac model. You must enable 32-bit addressing in the Memory control panel after running the Digital Performer installer.

RAM requirements

Digital Performer requires at least 20 megabytes (Mb) of RAM, but this configuration may require you to lower Digital Performer's default memory partition or strip your system of extensions, control panels and fonts. More RAM is recommended. Sound Manager audio requires at least 24Mb of RAM. 32Mb is recommended.

Digidesign hardware

Digital Performer 2.1 ships with DAE version 3.1.1, which supports the following Digidesign hard disk recording systems:

- Audiomedia II & III
- Sound Tools II
- Pro Tools (4-16 channels)
- Pro Tools Project (formerly called *Session 8*)
- Pro Tools III (16-48 channels)

Some of these systems may not be supported in future versions of DAE. Please check with Digidesign regarding compatibility with versions of DAE later than 3.1.1. Also check with Digidesign regarding hard drive compatibility.

Install and test your Digidesign hardware first

If you have a Digidesign system, we recommend that you install and test your Digidesign hardware before installing Digital Performer. If possible, try playing audio with Pro Tools software to verify that the hardware is properly installed and functioning normally. If you experience problems, this will help focus your troubleshooting and eliminate Digital Performer as a possible cause. Once you've got the Digidesign hardware working, you will most likely not have problems with Digital Performer.

INSTALLING DIGITAL PERFORMER

Before installing Digital Performer, we recommend that you review the hardware requirements listed above before proceeding.

Determining if you need a "FAT" version

The Digital Performer installer automatically installs a 68K or PPC (PowerPC) application depending on your computer. Alternately, you can use the *Custom Install* feature to install a "FAT" version that will run on any type of Macintosh. For example, you should install the FAT version if you are installing Digital Performer on a hard drive that will be used with both 68K and Power Macintosh computers.

Attention Digidesign hardware owners

If you have one of the following Digidesign hard disk recording systems, then you must use the Custom Install option to install Digital Performer with DAE version 2.96:

- Sound Tools II
- Pro Tools I or II (4-16 channels)

DAE 2.96 is an earlier version of the Digidesign audio engine that is still compatible with these systems. (The Digital Performer Easy Install option installs DAE 3.1, a current version that is no longer compatible with these older systems.)

Disabling extensions

Before running the Digital Performer installer, disable all third-party extension and control panels, except for any extensions required by your CD-ROM drive. We particularly recommend temporarily disabling virus protection utilities, which may cause problems with the Digital Performer installer.

Running the Digital Performer installer

To run the Digital Performer installer:

1 Insert the Digital Performer installer CD-ROM.

2 Double-click the "Install Digital Performer 2.1" icon. If you wish to install Digital Performer with a Japanese version of the Help and "Read Me" files, double-click the "Install Digital Performer 2.1J" icon.

3 Follow the directions the installer gives you.

4 When the installer asks you to authorize your hard drive, insert the Digital Performer authorization disk (the disk with the colored label). If the authorization disk is not available for some reason, click Cancel. The installation will be completed without the authorization disk, which will be requested the first time you open Digital Performer instead.

NOTES ABOUT INSTALLATION

The following sections discuss a few things that might be useful for you to know about Digital Performer installation.

What gets installed and where

The Digital Performer installer places many items on your hard drive, including System Folder extensions, demo files, FreeMIDI utilities and so on. If you would like a summary of what gets installed and where it has been placed, run the installer and read the description displayed below the Easy Install option. If you would like further details, choose the Custom Install option and use the "i" button to the right of each item in the list for detailed information about what it is a where it gets placed.

Installing on a hard drive that is not the current start-up drive

The Digital Performer installer lets you install Digital Performer itself on any available hard drive. The installer places System Folder items into the current start-up System Folder. If you need to install Digital Performer's system items into a different System Folder, don't try dragging them from one System Folder to the other. There are too

many items to keep track of and it is therefore easy to make a mistake. Instead, we recommend that you restart your computer from that System Folder and run the Digital Performer installer.

In some situations, it might be more convenient to run the Digital Performer installer from a hard drive, rather than from the Digital Performer installer CD-ROM disc. To do so, just copy the "Install Digital Performer" icon from the Digital Performer installer CD onto the hard drive and then run it from the drive.

What happens if your start-up hard drive already has a copy of DAE on it

The Digital Performer installer searches for copies of DAE on your start-up drive. If it finds a copy, it will check the version number. If it detects an older version, it will notify you and let you decide if you want to replace it or halt the installation so you can back it up first. If you have other copies of DAE on your start-up drive, they will be deleted by the installer, so you may want to move them to another drive (other than your start-up drive) before doing an complete Digital Performer install.

The Digital Performer installer does not alter the TDM plug-ins folder, or any other folder inside the DAE folder.

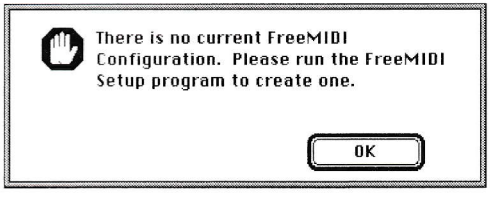
Authorizing your hard disk

During installation (or maybe when you run Digital Performer for the first time), you may be asked to insert your Digital Performer authorization disk (the disk with the colored label) so that you can authorize your hard disk or re-verify an existing authorization from an earlier version. Follow the directions on the screen to authorize Digital Performer to run on your hard disk (or re-verify an existing authorization).

If you would like more information about authorizing, see "Authorizing your hard disk" on page 25 of the Performer *Getting Started* manual, as well as "About authorizing" on page 25.

Creating a FreeMIDI configuration

If you see the message about FreeMIDI as shown below after running Digital Performer for the first time, don't worry. Just proceed to Chapter 5, "Getting Started with FreeMIDI" on page 41 of the Performer *Getting Started* manual. This message only means that you need to describe your MIDI setup to Digital Performer.



WHERE TO GO NEXT

Digital Performer ships with four separate manuals, which are briefly described below.

Digital Performer Version 2.1 'Read This First'

This booklet contains important installation instructions and information not covered in the other manuals about new features and program enhancements in Digital Performer Version 2.1.

Performer "Getting Started" Manual

The Performer *Getting Started* book contains basic installation and setup information. It tells you how to set up FreeMIDI. It provides a brief overview of Performer's main features (including a summary of new ones), as well as two extensive tutorials. One tutorial takes you step by step through the process of recording your first MIDI track. The second tutorial shows you step by step how to build an entire song, while introducing you a number of basic tasks such as cycle-recording, quantizing and step recording.

This book is ideal for those who are new to Performer and would like a brief look at "the lay of the land".

Performer Reference Manual

The Performer *Reference Manual* contains all the chapters having to do with Digital Performer's MIDI capabilities. If you are already familiar with Performer, you can consider this to be an up-to-date reference for Performer's MIDI features, and you can turn to the *Guide to Digital Audio* (described below) for information about audio features that are unique to Digital Performer.

Digital Performer Guide to Digital Audio

The Digital Performer *Guide to Digital Audio* contains all information having to do with Digital Performer's audio capabilities, including an overview, tutorial and troubleshooting chapter written exclusively for audio features. In addition to being an audio reference, this book is ideal for anyone who is already familiar with Performer and would like information about Digital Performer's audio features.

The *Guide to Digital Audio* is divided into five parts:

Part I: What's New
This section contains a brief overview of new audio features that were first introduced in Digital Performer Version 2.0.

Part II: Tutorials
This section provides a brief overview of audio features in the form of a guided tour through the demo project that ships with Digital Performer. It also provides a chapter on digital audio basics for those who are new to random access digital audio recording.

Part III: Digital Audio Reference
This section contains complete documentation on all of Digital Performer's audio-related features.

Part IV: Guide to PureDSP™
This section contains complete documentation on all of Digital Performer's powerful audio pitch-shifting, time stretching and sample rate conversion features.

Part V: Appendices
This section contains a chapter dedicated to audio troubleshooting.

Where to go next

The chart on the following page provides several recommendations for where to go next.

What you want	Where to go next
For a brief overview of new features in Version 2.1	This booklet chapter 2, "What's New in Digital Performer 2.1" (page 11)
For a brief overview of new features recently introduced in Version 2.0	Guide to Digital Audio chapter 3, "What's New in Digital Performer 2.0" (page 11)
For a brief overview of Digital Performer's audio time-scaling and pitch-shifting features	Guide to Digital Audio Part IV: "Guide to PureDSP™" on page 141
For a brief overview of other new features in Performer	Performer Getting Started "What's New in Performer® 5.5" on page 9.
For a brief overview of Performer in general	Performer Getting Started chapter 7, "Performer Overview: A Picture-book Tour" (page 45)
For a brief step-by-step tutorial about recording MIDI	Performer Getting Started chapter 8, "Getting Started: Recording Your First Track" (page 67).
For an extensive tutorial about how to cycle-record and build a sequence	Performer Getting Started chapter 9, "Tutorial: Building a Sequence" (page 75).
If you are new to digital audio recording and you'd like some basic information about it	Guide to Digital Audio chapter 5, "Hard Disk Recording Basics" (page 29) chapter 6, "Audio Track Basics" (page 37)
For a brief overview of Digital Performer's basic audio features	Guide to Digital Audio chapter 4, "A Guided Tour of Digital Performer" (page 15)
If you need to start recording audio right away	Guide to Digital Audio chapter 7, "Recording Audio" (page 45)
If you need to start sequencing right away	Performer Getting Started chapter 7, "Performer Overview: A Picture-book Tour" (page 45)

CHAPTER 2 What's New in Digital Performer 2.1

OVERVIEW

Digital Performer Version 2.1 introduces the following enhancements:

- Sound Manager support on Power Macintosh (audio recording and playback without extra hardware)
- Real time audio effects plug-ins
- New Samplers window
- Support for Adobe Premiere plug-ins with background processing
- Ramp automation of volume and pan
- Soundbite layering and improved handling of audio recording and editing
- Drag and drop importing and exporting of soundbites and sound files
- Bounce to Disk command
- Other enhancements

APPLE SOUND MANAGER SUPPORT

Digital Performer 2.1 can record and play back digital audio on a Power Macintosh without additional hardware. This capability is made possible by Sound Manager, a standard Macintosh system extension, and a new extension developed by Mark of the Unicorn called the *MOTU Audio System.*

Audio input and output is handled by the Macintosh built-in stereo input and output jacks (or any other input and output options that are present in Sound Manager on a particular Power Macintosh system).

The number of audio tracks (voices) you can record and play simultaneously depends on your Power Macintosh. A faster computer with more RAM and a fast hard drive gives you more voices. A slower computer with less RAM and a slow hard drive gives you fewer voices. A studio configuration feature allows you to maximize the number of tracks for your computer while at the same time ensuring optimum performance.

The MOTU Audio System provides a complete audio recording environment, including many features previously only available on expensive hardware-based systems. Advanced features include an adjustable number of internal busses, aux tracks, master faders and sends. The MOTU Audio System also provides a plug-in architecture for real-time audio effects, such as EQ, dynamics, reverb, echo and others.

When using the MOTU Audio System, you can use just about all of Digital Performer's audio features as described in the Digital Performer *Guide to Digital Audio.*

REAL TIME AUDIO EFFECTS & EQ

When Digital Performer is using the Macintosh's built-in sound capabilities, it provides real-time effects plug-ins, including reverb, dynamics effects and EQ. The effects can be applied to audio tracks via the five effects inserts for each audio track in the Mixing Board.

The number of effects inserts you can apply at any one time depends on your Macintosh hardware. There is no built-in limit in Digital Performer.

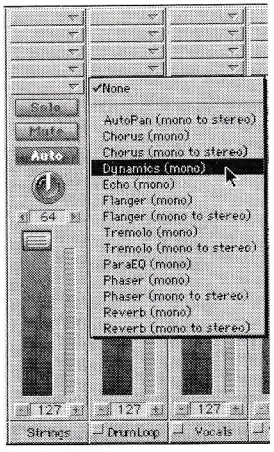


Figure 2-1: Digital Performer 2.1 provides real time effects plug-ins for audio tracks. Shown here are the mono and mono-to-stereo versions. Stereo versions are also provided on stereo tracks.

Effects plug-ins that ship with Version 2.1 include:

- AutoPan
- Chorus
- Dynamics (compressor, expander, limiter, gate)
- Echo
- Flanger
- Tremolo
- Parametric EQ (notch, hi/lo shelf, hi/low pass)
- Phaser
- Reverb

Mono and stereo versions of each are supplied (except for AutoPan, which has no mono version), as well as mono-to-stereo versions of AutoPan, Flange, Tremolo, Phaser and Reverb.

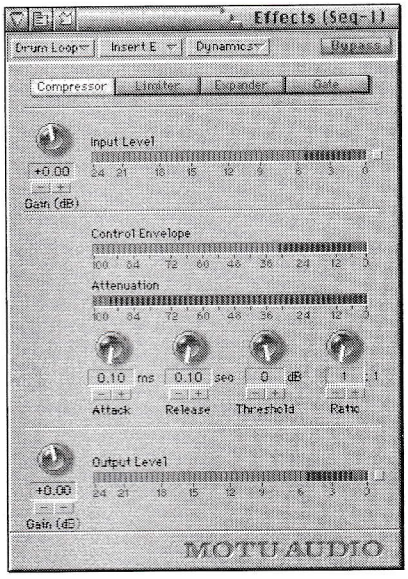


Figure 2-2: Digital Performer 2.1's real time Dynamics plug-in for audio tracks.

Presets are provided for many effects, and you can create and save your own presets.

Settings can be copied and pasted between inserts, and you can transfer presets from one file to another using the Load feature.

THE SAMPLE SYSTEM

Digital Performer 2.1 has a new window called the Samplers window. This window lets you connect a sampler to your Macintosh as a SCSI device and then use drag and drop techniques to transfer audio from the sampler onto your Mac hard disk (in Sound Designer II file format) and vice versa (from the Mac into the sampler). You can also drag and drop audio between the sampler and any window in Digital Performer that holds audio, such as the Audio Graphic Editor, the Soundbites window, audio track event lists, etc.

This feature brings together the worlds of sampler-based audio and hard disk-based audio, allowing you to easily transfer sounds between the two environments so that you can take advantage of the inherent strengths offered by each one.

The Samplers window — and the drag and drop features that go with it — are called the *Sample System*.

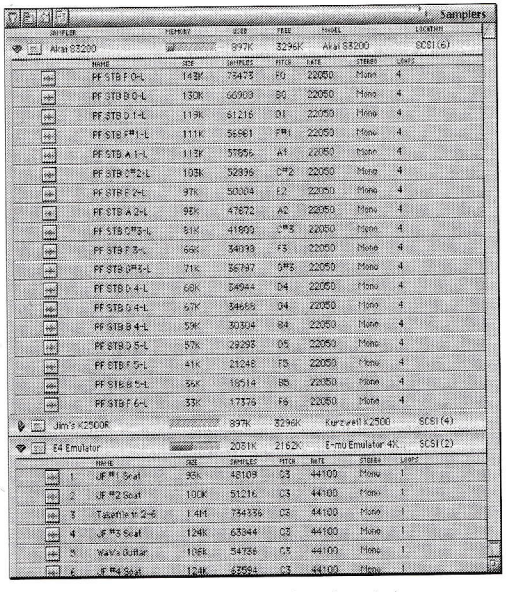


Figure 2-3: Digital Performer 2.1's new Samplers window.

ADOBE PREMIERE™ PLUG-INS

Adobe Premiere plug-ins are third-party audio processing modules that support the Adobe Premiere plug-in format. Digital Performer 2.1 now supports this format, allowing you to use any third-party Premiere plug-in on your audio directly within Digital Performer.

Since the Premiere plug-in format employs disk-based processing that is not real time, Digital Performer processes Premiere plug-ins in the background, just like it's PureDSP pitch-shifting, time-scaling, spectral effects and sample rate conversion features.

Real-time previewing is supported for plug-ins that provide it.

Digital Performer 2.1 includes two Premiere plug-ins developed by Mark of the Unicorn: Invert Phase and Reverse.

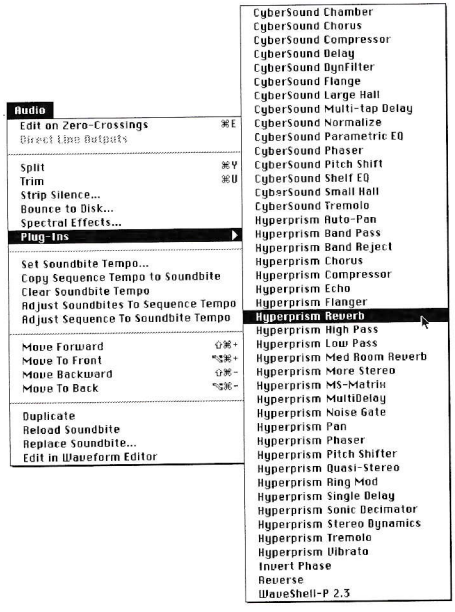


Figure 2-4: Examples of third party Premiere plug-ins in Digital Performer's Audio menu. Shown here are CyberSound™ from Invision Interactive, Hyperprism™ from Arboretum Systems, and Waves™ plug-ins from Waves, Inc.

BOUNCE TO DISK COMMAND

Version 2.1 has a new *Bounce to Disk* command that replaces Digital Performer's old *Mix* command. Bounce to Disk does exactly as its name implies: it bounces multiple audio tracks down to a single track or a stereo track pair. All real time effects and mix automation are included, so that what you hear before you bounce is exactly what you get in the mixdown. You can select entire tracks or any portion of any track for bouncing. Original tracks are always preserved, and new audio files created during bouncing can be saved in 8, 16 or 24-bit resolution. Bouncing can be done in real time on Pro Tools/TDM systems. Under the MOTU Audio System (and non-TDM Digidesign systems), bouncing can operate faster than real time if the speed of your Macintosh system allows. This feature lets you bounce — and then play back — many more tracks than you can play simultaneously on your system.

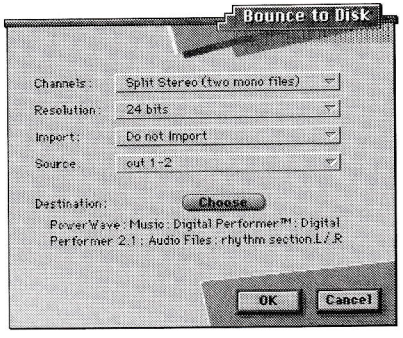


Figure 2-5: Digital Performer's new Bounce to Disk feature.

DRAG AND DROP IMPORT/EXPORT

This feature works hand-in-hand with the new Samplers window. Digital Performer 2.1 allows you to import and export audio files and soundbites by dragging and dropping them between the Finder and Digital Performer's Soundbites window or Samplers window. You can also drag and drop audio from the Finder, Soundbites window or Samplers window into any Digital Performer window that supports audio.

RAMP AUTOMATION OF VOLUME AND PAN

Digital Performer 2.1 now supports ramp automation of volume and pan data in audio tracks when running under either DAE or the MOTU Audio System. In earlier versions, audio volume and pan events functioned like MIDI volume and pan events in the sense that they created an immediate change in volume. In version 2.1, audio volume and pan events create a smooth change, calculated internally by either DAE or the MOTU Audio System driver, from one event to the next. The benefits of this new approach are that automation is smoother and requires less CPU overhead (making automation less taxing on the system as a whole).

Ramp automation is depicted in the Audio Graphic Editor as sloping lines between control points, as shown below in Figure 2-6, instead of the horizontal lines between points that appeared in earlier versions of Digital Performer.

When you open old files, Digital Performer preserves the performance of their volume and pan automation data. If the "stair-step" data in the old file simulates a ramp closely enough, Digital Performer 2.1 will convert it into a ramp. If not, the old stair step automation will remain.

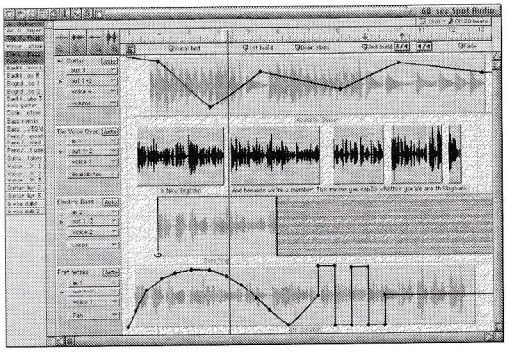


Figure 2-6: Digital Performer's new ramp automation features are depicted as sloping lines connecting volume and pan events as shown here.

SOUNDBITE LAYERING

In Digital Performer 2.1, audio recording is more like tape recording and less like MIDI track recording than in previous versions. For example, if you record over the beginning of a soundbite, earlier versions would remove the entire soundbite from the track, just as a MIDI note would be removed if recorded over. Now, in Version 2.1, only the portion of the soundbite recorded over is removed (and replaced by the new material). And what you see is always what you hear.

If you would like to preserve existing material when overdubbing, you can record in overdub mode, which layers new material on top of old material without erasing it, and then use Digital Performer's new audio layering commands in the Audio menu to graphically choose what will play. New layering commands include Send forward/backward and Send to Front/Back.

Together, these features give you much more intuitive control and flexibility in managing your audio tracks.

OTHER ENHANCEMENTS

Digital Performer 2.1 has the following additional enhancements:

- The *Start* and *End* buttons have been restored to the selection bar area of the Tracks window. These buttons have also been restored to their respective places in the Memory bar in the Main Control panel. There are also keyboard equivalents for them (the F5 and F6 keys) in the Remote Controls window (available since Version 2.0).

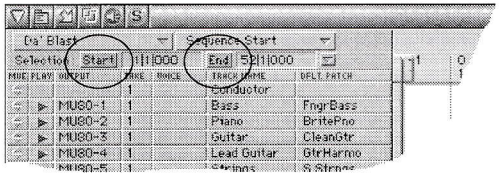


Figure 2-7: The Selection bar Start and End buttons have returned in Digital Performer 2.1. They work the same way they did in previous versions of Performer: click once to load the current counter location. Double-click to load either the start or end of the entire sequence.

- The new *Audio System* hierarchical menu in the Basics menu as shown below lets you choose the audio system you will be using. Choices are: DAE, MOTU Audio System, or MIDI Only. On 68K Macs, the choices are DAE and MIDI Only.

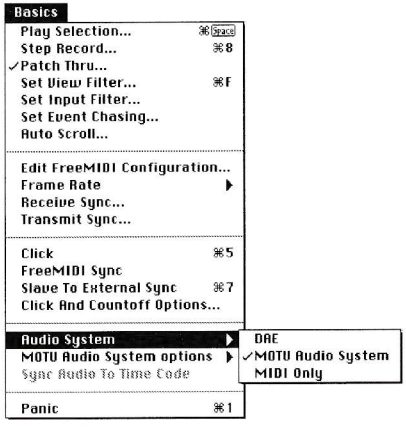


Figure 2-8: The new Audio system menu item in the Basic menu lets you choose which audio system (or MIDI only) you wish to use. You can freely switch at any time.

■ Below the Audio System menu is another new hierarchical menu item, as shown below in Figure 2-9.

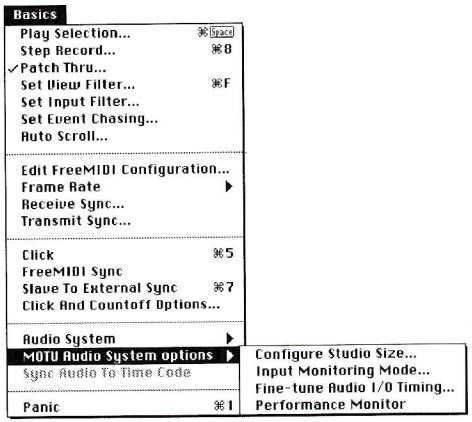


Figure 2-9: The 'MOTU Audio System Options' menu item has a sub-menu of commands that apply to the MOTU Audio System. They are described in further detail in chapter 3, "MOTU Audio System" (page 17). When you choose DAE as your current audio system, this menu item changes to 'Configure DAE' and provides options that are specific to DAE, such as the 'Buffer Size' command.

■ The new *Cursor Selection Mode* command in the Edit menu lets you choose between several different cursor modes when working in the Tracks Overview and Graphic Editing windows.

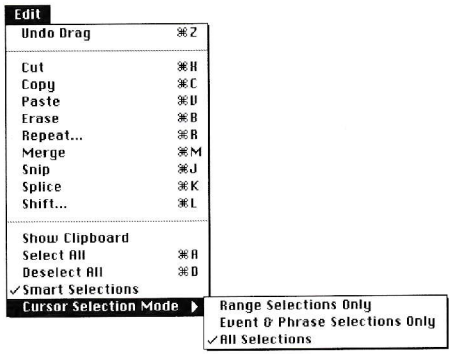


Figure 2-10: The 'Cursor Selection Mode' menu item lets you choose the types of selections you will be able to make in the Tracks Overview and Graphic Editing windows. The 'All Selections' option lets you make both time range selections and event selections, just like Version 2.0. If you choose 'Range Selections Only', tracks overview selecting works just like it did in Version 1.7.

■ As shown above in Figure 2-10, there is a new *Deselect All* command in the Edit menu (with a new command-d keyboard equivalent) that deselects the current selection in all windows.

■ Undo Record now removes the soundbite you just recorded from the soundbite list and moves the audio file to the trash. If you choose Redo Record, the audio file is retrieved from the trash, and the corresponding soundbite is restored to the track in its original location.

■ All of Digital Performer's transport shuttling and looping features now properly chase soundbites and audio automation.

■ Digital Performer now supports Sound Designer II file loops. Loop points that have been defined in a Sound Designer II file with another program will now appear in Digital Performer's new Samplers window. In addition, their length is properly adjusted when the audio file is time-scaled in Digital Performer.

■ Digital Performer's automated takefile names now reflect the source of the audio with the following suffixes: *in* (for input) and *bus*.

■ The *Interface Settings* command has been removed. This command is available in FreeMIDI Setup, which you can launch from within Digital Performer using the *Edit FreeMIDI Configuration* command.

■ Audio patch thru on non-TDM Digidesign systems has been improved.

■ The selection bar start time now determines the paste location even when it is currently set to a time that is after the selection bar end time.

■ Soundbite volumes have been removed from the program in place of the new ramp automation. When opening old files, soundbite velocities are converted into ramp automation to preserve the original performance of the file.

CHAPTER 3 MOTU Audio System

OVERVIEW

Digital Performer 2.1 can record and play back digital audio without additional hardware installed inside your Macintosh. This capability is made possible by Sound Manager, a standard Macintosh system extension, and a new system extension developed by Mark of the Unicorn called the *MOTU Audio System*.

The number of audio tracks (voices) you can record and play simultaneously depends on your Macintosh system. A faster computer with more RAM and a fast hard drive gives you more voices. A slower computer with less RAM and a slow hard drive gives you fewer voices. This chapter tells you how to obtain the best performance possible from your Mac.

The MOTU Audio System provides a complete audio recording environment, including many features previously only available on expensive hardware-based systems. Advanced features include an adjustable number of internal busses, aux tracks, master faders and sends.

The MOTU Audio System also provides a plug-in architecture for real-time audio effects, such as reverb, compression and EQ. These real time effects are covered in detail in Chapter 4, "Audio Effects" (page 33).

When using the MOTU Audio System, you can use just about all of Digital Performer's audio features as described in the Digital Performer *Guide to Digital Audio,* which accompanies this booklet. There are, however a few differences, and this chapter provides a complete summary.

This chapter also explains several features that are unique to the MOTU Audio System, such as the ability to choose the overall number of simultaneously available voices.

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Preparing your Mac 18
Sound control panel settings 19
Adjusting memory allocation 20
Summary of features 21
Monitoring audio input 24
Slaving to external sync 27
Adjusting system performance 27
Monitoring system performance 32

SYSTEM REQUIREMENTS

To use the MOTU Audio System, you need a Power Macintosh with at least 24 Mb of RAM; it will not run on a 68K Macintosh. The MOTU Audio System also requires System 7.5 or higher. System 7.6 or higher is recommended.

The MOTU Audio System also requires the following Apple system extensions, which are included with Digital Performer and installed automatically by the Digital Performer installer:

- Sound Manager 3.2.1 (or higher)
- SOMobjects™ for MacOS 2.0.8 (or higher)

The Digital Performer 2.1 installer also places a folder called *MOTU* in the extensions folder of your Mac's System Folder. The MOTU folder contains the basic components of the MOTU Audio System as shown below in Figure 3-1.

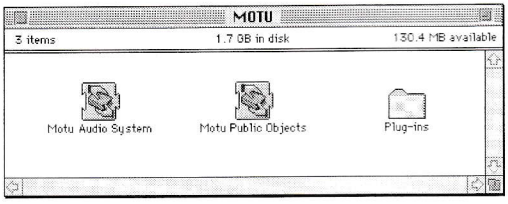

Figure 3-1: The Digital Performer 2.1 installer places a folder called 'MOTU' in the Extensions Folder inside your Mac's System Folder. The MOTU folder contains the basic components of the MOTU Audio System, including a plug-ins folder.

PREPARING YOUR MAC

Here are several things you need to do before using Digital Performer's native audio recording and playback features.

Good disk hygiene: optimize your hard drive

Hard disk recording makes severe demands on your computer's hard drive. The more tuned-up your hard drive, the better performance you will get out of the MOTU Audio System. Get an up-to-date hard disk optimization utility. Use it to keep your hard drive defragmented and updated with the latest drivers that are compatible with your model of Macintosh. Always try to use the latest version available (updates are frequently posted on the web sites of companies that supply hard disk optimization utilities). But confirm that the version you are using supports your model of Macintosh. Out-of-date or incompatible hard disk drivers can cause endless headaches, not just with the MOTU Audio System. Your hard disk optimization utility, and the company that develops it, should be able to guide you. But as far as the MOTU Audio System goes, there are no special requirements. Just make sure your hard drive is as tuned up as possible.

Free up as much RAM as possible

Hard disk recording uses a lot of RAM. In addition, the number of audio voices you can record and play simultaneously is directly related to the amount of memory available in your Mac. More available RAM gives you more audio voices, up to the limits of your hard drive. You may want to use Extensions Manager (or other extension management utility) to make a reduced set of system extensions for use with Digital Performer. Just remember to include FreeMIDI and the other extensions required by the MOTU Audio System mentioned earlier in this chapter. Also see "Adjusting system performance" on page 27 for more information about effectively managing your computer's resources for optimum performance.

Turn off File Sharing

File sharing can interfere with intensive disk accessing required for audio recording and playback. You will experience better performance from the MOTU Audio System by turning it off.

Memory control panel settings

Open the Memory control panel and make sure that virtual memory is turned off. Virtual memory uses hard disk space to emulate RAM, but it is much too slow to support Digital Performer's real time recording and playback features. Also be sure the *Modern Memory Manager* option is turned on.

Increasing the *Disk Cache* size can help improve performance, too, especially if you tend to repeat portions of audio, like drum loops, in your music.

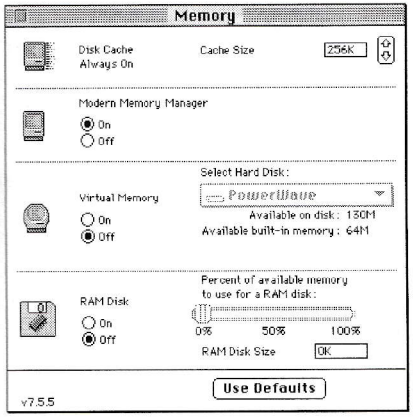

Figure 3-2: Use these settings in the Memory control panel.

SOUND CONTROL PANEL SETTINGS

The Macintosh Sound control panel is where you make the following important settings:

- Audio input source
- Audio resolution
- Audio output

Choosing an audio input source

Use the Sound Control panel to choose the audio input from which you wish to record into Digital Performer. The options available depend on your Macintosh system. For example, your Mac might provide a built-in audio input, as well as an input from a built-in CD player, as shown in Figure 3-3.

☛ The MOTU Audio System may not work with sound input options other than the built-in ones shown in Figure 3-3.

The 'Playthrough' option

The Playthrough option, when checked, causes the Macintosh to patch audio from its input directly to its output. This option has important consequences for recording in Digital Performer. Be sure to read "Monitoring audio input" on page 24 of this chapter for complete information.

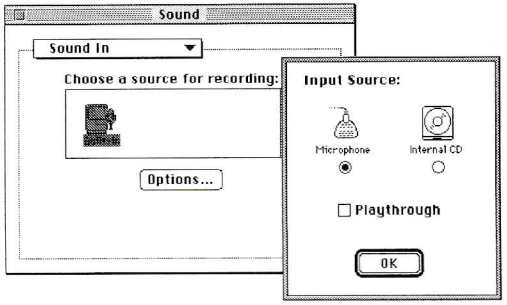

Figure 3-3: The Sound Control panel 'Sound In' options let you choose the source from which you would like to record. The 'Playthrough' option can be controlled from within Digital Performer and is explained in detail later in this chapter in "Monitoring audio input" on page 24.

Setting audio output

The Sound control panel also lets you choose the output for the stereo mix produced by Digital Performer, as shown in Figure 3-4. The choices available depend on your Macintosh system.

☛ The MOTU Audio System may not work with sound output options other than the built-in option shown in Figure 3-4.

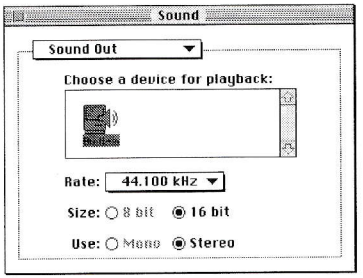

Figure 3-4: The Sound Control panel determines where Digital Performer's audio output will be.

Choosing an audio resolution

The Sound Out control panel shown in Figure 3-4 also lets you choose a bit resolution for the audio you record and play back in Digital Performer. Make sure that you choose 44.100 KHz and 16-bit

resolution. If you have a very slow Power Macintosh, you may need to choose 22.050 KHz, which requires much less work by the computer. Digital Performer does not support recording and playback of 8-bit audio, although it does allow you to bounce down audio to 8-bit sound files. See Chapter 8, "Bounce To Disk" (page 53) for details.

Setting the output volume

The Sound Control panel has volume settings that control the overall volume output of the Macintosh. The level you set here is the maximum level you will obtain from Digital Performer, which gives you fine-tuned control over your volume mix with its extensive mixing features.

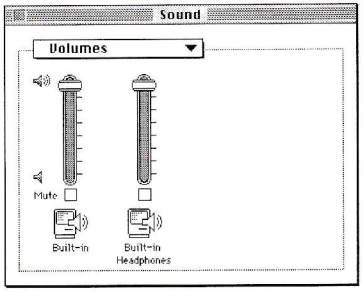

Figure 3-5: Use the Sound Control panel to set the maximum volume output from Digital Performer.

Attenuating the beep volume

If you amplify the Mac's audio output to monitor your music mix, remember that you are also amplifying your Mac's beep sound. Therefore, you may want to turn it down.

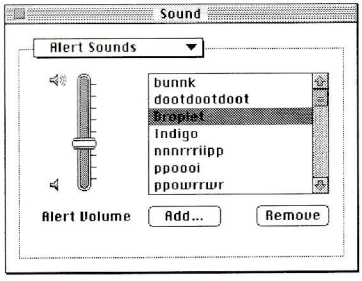

Figure 3-6: If you are amplifying the Mac's audio output, you may want to turn down the beep volume in the Sound Control panel.

ADJUSTING MEMORY ALLOCATION

The first time you run Digital Performer 2.1, it examines your Macintosh and adjusts itself for an optimum number of audio voices and the best possible performance on your system. However, you may be able to further improve the situation by adjusting Digital Performer's memory allocation (in its *Get Info* window).

In earlier versions of Digital Performer, you may have allocated large amounts of RAM to Digital Performer while thinking, "I might as well allocate the extra RAM to Digital Performer, since I don't have anything else running when I use DP."

With Version 2.1 and the MOTU Audio System, your approach should be as follows: instead of assigning as much RAM as possible to Digital Performer, try to assign only a comfortable amount of RAM to Digital Performer (so that there are at least a few megabytes free in Digital Performer's Memory window). This frees up as much RAM as possible for the MOTU Audio System, giving you as many audio voices as possible on your Macintosh.

To adjust Digital Performer's memory allocation:

1 Open Digital Performer 2.1 and open a file that is typical in size for your Digital Performer projects.

2 Open the Memory window and make note of the amount of available memory.

You want to have at least 3-4 Megabytes free, if possible, but not much more than that because you want to save the rest for the MOTU Audio System.

Figure 3-7: Digital Performer's Memory window. Open a file that is typical in size for your Digital Performer projects in general. You want to see approximately 3-4 Megabytes free, if possible, but not too

much more than that. Having too much available RAM in Digital Performer means less memory for (and lower performance from) the MOTU Audio System.

3 If you need to adjust how much memory is available in Digital Performer, quit the program and use the Get Info command to increase its minimum and suggested memory allocation as needed.

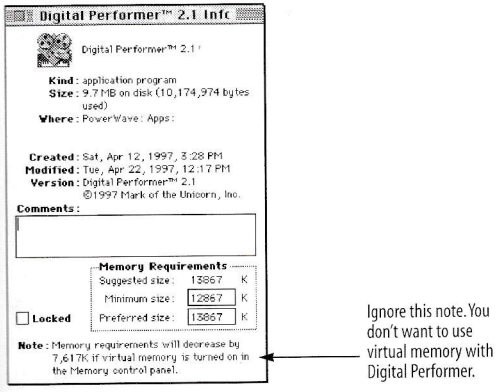
Digital Performer™ 2.1 Info
Digital Performer™ 2.1
Kind: application program
Size: 9.7 MB on disk (10,174,974 bytes used)
Where: PowerWave: Apps:
Created: Sat, Apr 12, 1997, 3:28 PM
Modified: Tue, Apr 22, 1997, 12:17 PM
Version: Digital Performer™ 2.1
©1997 Mark of the Unicorn, Inc.
Comments:
Memory Requirements
Suggested size: 13867 K
Minimum size: 12867 K
Preferred size: 13867 K
Locked
Note: Memory requirements will decrease by 7,617K if virtual memory is turned on in the Memory control panel.
Ignore this note. You don't want to use virtual memory with Digital Performer.

Figure 3-8: Use the Get Info window in the Finder to increase or decrease Digital Performer's memory allocation as needed.

If you've made memory allocation adjustments, you might be able to increase the number of audio voices available in Digital Performer. For more information about RAM allocation, the number of audio voices you get, overall performance, and adjusting the number of audio voices, see "Monitoring system performance" on page 32 and "Adjusting system performance" on page 27.

SUMMARY OF FEATURES

Just about all of Digital Performer's digital audio recording, editing and mixing features are available to you when you are using the MOTU Audio System. These features are explained at length in the Digital Performer *Guide to Digital Audio*. There are, however, a few differences as noted in the following sections. Each section corresponds to a chapter in the *Guide to Digital Audio*. When reviewing the following sections, you may want to follow along on the corresponding pages in the *Guide to Digital Audio*.

A Guided Tour of Digital Performer (Audio Guide page 15)

Everything mentioned in this chapter applies to using audio under the MOTU Audio System — with the exception of several new features introduced in Version 2.1. For example, audio volume automation data as shown on page 18 now functions as 'ramps' that gradually and smoothly change from one event to the next, instead of making a sudden jump in volume at the next event.

Also, audio tracks in the mixing board as shown on page 20 always have five insert pop-up menus when you are using the MOTU Audio System, which has its own array of real time audio effects such as EQ, reverb and dynamics effects. MOTU Audio System effects are handled the same way as TDM effects, as described in this chapter.

The Audio menu shown on page 22 has several new commands introduced in Version 2.1: the *Plug-ins* hierarchical menu and the *Move* commands. See Chapter 6, "Premiere Plug-ins" (page 49) and Chapter 7, "Soundbite Layering" (page 51) in this guide for more information about these new features.

Hard Disk Recording Basics (Audio Guide page 29)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System.

Audio Track Basics (Audio Guide page 37)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, with the following additional information.

The number of audio voices you get in the Voice pop-up menu depends on your Macintosh. See "Monitoring system performance" on page 32 and "Adjusting system performance" on page 27 of this guide for information about optimizing your system to possibly obtain more voices.

Unlike DAE, the MOTU Audio System has no "track limits". In other words, there is no limit to the number of audio tracks that can be concurrently assigned to audio voices. Just remember: the number of audio voices that can play simultaneously at any given moment depends on the performance of your Macintosh and hard drive(s). Also, if you have several tracks assigned to the same voice, the track that is highest in the list takes priority over tracks below it that are assigned to the same voice.

Like DAE, the MOTU Audio System allows for "unregistered" tracks as explained in "Registered and unregistered audio tracks" on page 40 of the *Guide to Digital Audio*. Here's an example: if you create a Digital Performer file on a Mac with a Pro Tools system, and then open the file on another Mac with no extra audio hardware, tracks that were assigned to Pro Tools outputs 7-8, for example, would become unregistered. That is, their output assignment becomes italicized to indicate that outputs 7-8 are not currently available in the current Macintosh system. If you later reopen the file on a Pro Tools system, the track will become registered again.

Like DAE, the MOTU Audio System does not currently support the recording or playback of interleaved stereo Sound Designer II files. To play back a stereo sound file in Digital Performer, you can let Digital Performer deinterleave it when you first import it.

Unlike DAE, the MOTU Audio System will respond promptly when you mute and unmute audio tracks during playback.

Digital Performer 2.1 will not play audio when it is the background application.

A new model for audio tracks

Regardless of whether you are using DAE or the MOTU Audio System, Digital Performer 2.1 has a new, improved model for recording, playing and editing audio in audio tracks. This new model differs from the information provided in the *Guide to Digital Audio* Chapter 5, "Hard Disk Recording Basics" (page 29). For more information about these differences, see Chapter 7, "Soundbite Layering" (page 51) in this guide.

Recording Audio (Audio Guide page 45)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, with the following additional information.

The MOTU Audio System gets its input from the source you have chosen in the Sound Control Panel. This could be the Mac's built-in microphone input or the Mac's built-in CD player, if available. In addition, the MOTU Audio System provides two ways to monitor (patch thru) an audio input signal. Before you attempt to do any recording, be sure to read "Monitoring audio input" on page 24 of this guide. The MOTU Audio System allows both manual and auto punch in.

The Audio Monitor (Audio Guide page 55)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, with the following additional information.

The Audio Monitor shows both inputs and busses. For example, typically you'll have two inputs (provided by Sound Manager), along with sixteen buses, for a total of 18 input sources. (The number of available buses is adjustable. See "Stereo buses" on page 29.) Bus inputs are displayed in the Audio Monitor because you can assign a bus to the input of a track, which you can then record. When you record a track that has a bus as its input, the audio input from the bus gets recorded onto your hard drive into the takefile shown for the bus in the

Audio Monitor window. To help you identify them, takefiles for bus inputs are given a default name that includes the word *bus*.

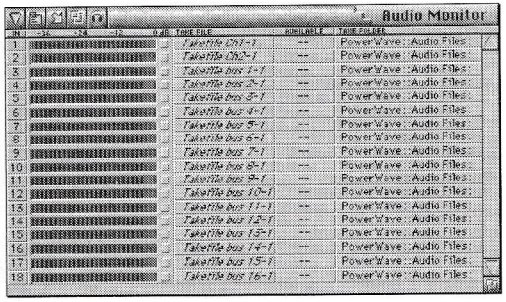

Figure 3-9: In this example, the Audio Monitor window is showing Sound Manager inputs (1 and 2) and bus inputs (3-18). Notice that the default takefile names for bus inputs include the word 'bus' to help you identify them as material recorded from a bus.

The Soundbites Window (Audio Guide page 61)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, with the following differences.

When you are using the MOTU Audio System instead of DAE, the audio file import dialog looks different than what is shown in Figure 9-4 on page 64 of the *Guide to Digital Audio*. Instead, you are presented with a standard Macintosh open file dialog. When you select the audio file to be imported, the MOTU Audio System imports the audio file as a whole, along with all of the regions in the audio file. You can also now import audio files by dragging and dropping them into the Soundbites (or samplers) window.

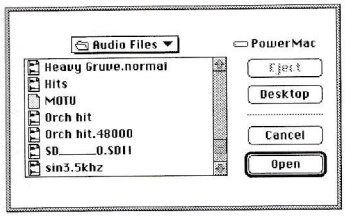

Figure 3-10: Importing audio. You can now also import audio by simply dragging and dropping the file from the Finder into Digital Performer's Soundbites or Samplers windows.

Audio File Management (Audio Guide page 75)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, except for the following difference.

The MOTU Audio System does not care on which hard drive you record and store your audio files. You can even store audio files for a single Digital Performer project on different hard drives. This can help improve the overall disk performance of your system because it distributes the intensive disk accessing burden across more than one disk.

The Audio Event List (Audio Guide page 81)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System.

Audio Graphic Editing (Audio Guide page 87)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, except for the new way in which Digital Performer 2.1 handles volume and pan automation data. See Chapter 7, "Ramp Automation" (page 35) in this booklet for details.

Editing Audio (Audio Guide page 107)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System.

Mixing Digital Audio (Audio Guide page 117)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System, except that many of the features described as Digidesign "TDM only" features are now also available under the MOTU Audio System.

For example, the MOTU Audio System provides 16 internal busses by default, although you can program any number of busses you want. (For details about adjusting the number of buses, see "Adjusting system performance" on page 27.)

Here is a summary of features provided by the MOTU Audio System that are described in the chapter as "TDM-only" features:

- Virtual mixing
- 16 internal busses (adjustable)
- 4 sends per track
- 5 real time audio effects inserts per track
- Real time EQ, dynamics, reverb and other effects
- Mono, mono-to-stereo, and stereo effects
- Aux tracks
- Master faders

All of these features work the same way as described in this chapter for TDM, with the exceptions noted below. For details about the MOTU Audio System's built in effects, see Chapter 4, "Audio Effects" (page 33) in this booklet.

There are just a few differences between the MOTU Audio System and TDM. First, the MOTU Audio system does not support the *Direct Line Outputs* item in the Audio menu. Second, under the MOTU Audio System, all inserts are pre-fader, including those on aux tracks and master faders. Under TDM, regular tracks have pre-fader inserts, but aux tracks and master faders have post-fader inserts.

Synchronizing Audio to SMPTE Time Code (Audio Guide page 129)

Digital Performer 2.1 can play MIDI and audio tracks while slaved to external time code, but certain limitations apply. See "Slaving to external sync" on page 27 of this guide for details.

The Mix Command (Audio Guide page 133)

The *Mix* command described in the *Guide to Digital Audio* has been replaced by Version 2.1's new *Bounce to Disk* command in the Audio menu. See Chapter 8, "Bounce To Disk" (page 53) for details.

Audio Preferences (Audio Guide page 135)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System.

Getting beats to line up with audio (Audio Guide page 137)

Everything in this *Guide to Digital Audio* chapter applies to the MOTU Audio System.

PureDSP processing

Everything in the *Guide to Digital Audio* chapters regarding PureDSP audio effects processing applies to the MOTU Audio System.

MONITORING AUDIO INPUT

Under the MOTU Audio System, input monitoring is turned on in the usual way: by record-enabling an audio track and clicking the button with the headphone icon in the title bar of the Audio Monitor window as shown below in Figure 3-11:

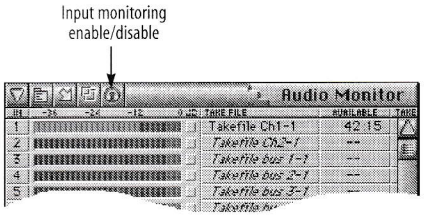

Figure 3-11: Turning input monitoring on and off.

When a track is record-enabled and input monitoring is turned on, you will hear input from the input source you have chosen in Sound Control Panel, such as the Mac's microphone input or input from the Mac's built-in CD player. You can also make Digital Performer route the input signal through any effects that are assigned to the currently record-enabled track in the Mixing Board. However, you should read the following sections first, which discuss several important issues surrounding audio input monitoring under the MOTU Audio System.

Sound Manager input delays

One of the current limitations of Apple's Sound Manager is that it introduces a slight but noticeable delay (usually about 50 milliseconds) when monitoring audio input. For example, if you have a sequence that already has several tracks of audio recorded, and you then try to record along with it while monitoring your input through Sound Manager, you will hear a slight delay in what you are recording. Interestingly, however, the audio will be recorded into the sequence accurately and in sync with the other previously recorded audio tracks (as long as you managed to play it in sync with the sequence). But what you *hear* while you are recording will be noticeably and consistently behind. In other words, what you hear during recording will not be what you get: during recording, the input signal will sound late, but when you play it back after recording it, it will be fine (again, as long as you managed to play it in time with the sequence).

To avoid this problem, Digital Performer gives you the option of using the Macintosh's direct, hardware-based monitoring, which patches input directly to the Mac's output via hardware. When you use hardware-based input monitoring, there is no delay in what you hear. However, the trade-off is that the input signal is not routed through the MOTU Audio System. This means that if you have effects such as EQ or reverb assigned to the track that is currently record-enabled, you will not hear the effects applied to the input signal.

In summary, your two choices for monitoring input are: 1) delayed input with effects, or 2) dry input with no delay.

In some cases, the delay won't matter. For example, you might want to experiment with some of Digital Performer's built-in effects without actually playing back the sequence. In this case, the delay is inconsequential. Or, if you are good enough player, you might be able to play in time with the sequence, even though what you are playing may sound consistently behind the rest of the sequence. But if you are in a situation where the delay is unacceptable, use hardware based monitoring.

Setting the input monitoring mode

The two choices for input monitoring are provided by choosing *MOTU Audio System options>Input Monitoring Mode* from the Basic menu, which opens the dialog shown below in Figure 3-12.

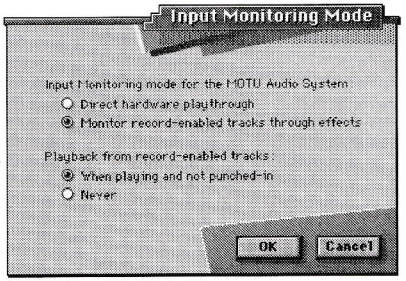

Figure 3-12: Under the MOTU Audio System, Digital Performer provides two input monitoring modes. 'Direct hardware playthrough' provides monitoring without delays, but it does not provide effects on the monitored signal. 'Monitoring record-enabled tracks through effects' lets you monitor input with effects applied to it, but there will be a noticeable delay in the signal.

Direct hardware playthrough

Direct hardware playthrough provides accurate monitoring with no delays, but if you have real time effects (EQ, reverb, etc.) assigned to the track being recorded into, you will not hear them during monitoring. Effects will, however, be applied to the recorded material during subsequent playback.

When this option is chosen, the input signal currently being monitored can always be heard, i.e. it will be patched through when Digital Performer is stopped, playing or recording.

This setting, when chosen, produces the same effect as when you check the *Playthrough* option in the Sound Control panel.

Monitor record-enabled tracks through effects

Monitor record-enabled tracks through effects lets you apply effects to the input signal (via the effects inserts of the currently record-enabled track), but you will hear a noticeable delay (usually around 50 msec) during recording. If, however, the input signal is actually received by the Mac in sync with the rest of the sequence, the input signal with be recorded properly (with no delay).

When this option is chosen, the input signal currently being monitored can always be heard when Digital Performer is either stopped or recording. During playback, however, the input signal being monitored will never be summed with existing track contents. Instead, you will hear either one or the other. The options discussed in the next section let you choose.

Choosing when the currently record-enabled track plays back

The two *Playback from record-enabled tracks* options shown above in Figure 3-12 determine when existing material in the currently record-enabled track will play back.

The 'When playing and not punched-in' option

This option means that you will hear existing material in the currently record-enabled track as long as you are not actually recording. As soon as you begin recording, either by clicking the record button or by programming an auto punch-in, playback of existing track contents will cease and input monitoring will take over. The same is true for other tracks assigned to the same audio voice as the currently record-enabled track.

The 'Never' option

The *Never* option means that you will never hear existing material in the currently record-enabled track play back, regardless of whether you are playing or recording and regardless of whether or not you are monitoring an input signal. Again, the same is true for other tracks assigned to the same audio voice as the currently record-enabled track.

Patch-thru summary chart

Here is a chart that summarizes what happens with the various combinations of settings in the Input Monitoring Mode dialog (Figure 3-12):

Input Monitoring settings	During playback	During recording	While stopped
Hardware patch thru + Play existing track contents	You'll hear both track contents and accurately timed input but no effects on the input.	You'll hear accurately timed input (without effects), but no track content.	Same as during recording
Hardware patch thru + Never play track contents	You'll hear accurately timed input (without effects), but no existing track content.	Same as during playback	Same as during playback
Software patch thru + Play existing track contents	You'll hear existing track contents only (no input signal).	You'll hear delayed input with effects, but no existing track contents.	Same as during recording
Software patch thru + Never play track contents	You'll hear delayed input with effects, but no existing track contents.	Same as during playback	Same as during playback

SLAVING TO EXTERNAL SYNC

Together, Digital Performer 2.1 and the MOTU Audio System have the ability to play MIDI and audio tracks while Digital Performer is slaved to external time code. Setup is done in the usual way as described in the Performer reference manual (via the *Receive Sync*, *Frame Rate* and *Slave to External Sync* commands in the Basics menu).

Keep in mind, however, that due to limitations imposed by Sound Manager, Digital Performer has no way to continuously resolve audio tracks to external time code — or the MIDI tracks they are playing along with. MIDI and audio tracks will always *start* exactly at the correct position when external time code is first received. But after playing for a while, audio tracks may drift out of sync with MIDI tracks.

MIDI tracks, on the other hand, will always remain continuously resolved to the incoming time code. The discrepancy between MIDI and audio tracks is caused by the fact that the audio tracks, once they begin, resolve to the Mac's internal timing hardware, not external time code. So, in essence, there are two independent clock sources: external time code and the Mac's internal clock. MIDI is slaving to the external time code and audio is slaving to the Mac. The inevitable result of two clocks running independently of each other is that they will drift, no matter how accurate they are. Practically speaking, the issue is: how long will it take for them to noticeably drift apart?

The time it takes for MIDI and audio tracks to noticeably drift apart depends on the accuracy of the time code that Digital Performer is slaving to. If you have an extremely accurate time code source, such as a time code generator or other crystal clock-based time code source, you might be able to play MIDI and audio for minutes at a time with no noticeable drift. If, however, the time code being received is not accurate (such as time code from an analog tape deck with its varispeed control adjusted several percent high or low), you might hear drift after only a few measures.

In most situations, you will probably be able to play for at least several minutes without noticeable drift. However, if you are using Digital Performer in a professional situation, we strongly recommend that you invest in a hardware-based digital audio recording system that can be properly and continuously resolved to time code.

ADJUSTING SYSTEM PERFORMANCE

The Studio Configuration dialog shown below in Figure 3-13 can be opened by choosing *MOTU Audio System options* > *Configure Studio Size* from the Basics menu. It is only available when Digital Performer is running under the MOTU Audio System.

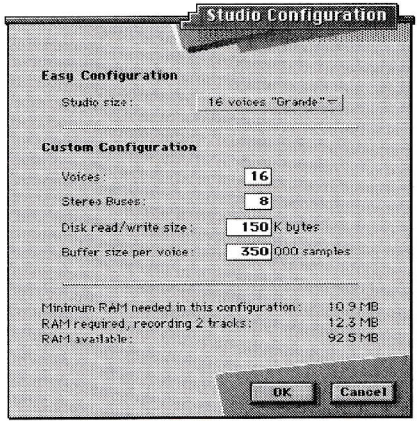

Figure 3-13: Digital Performer's Studio Configuration dialog.

The Studio Configuration dialog

The Studio Configuration dialog lets you set the number of audio voices (tracks) you can play simultaneously. At first, you can simply choose a studio size from the pop-up menu provided, which makes appropriate "ball park" buffer settings below. If you want to fine tune the settings, you can adjust the custom configuration options. The limits of these settings are governed by many

factors, including the amount of RAM in your Macintosh and the performance of your hard drive. This window alerts you (by displaying the RAM settings in red) when the settings you have chosen are not supported by the amount of RAM in your computer.

Free up as much RAM as possible

Before you attempt to adjust your studio configuration, you should try to free up as much RAM in your Macintosh as possible. Here are several things you can do:

- Quit all other programs when running Digital Performer. You should see only the System and Digital Performer in the *About This Macintosh* window (in the Apple menu).
- Follow the procedure in "Adjusting memory allocation" on page 20 of this chapter.
- Use Extensions Manager (or other extension management utility) to disable as many extensions and control panels as possible when running Digital Performer.
- Buy more RAM (it's affordable these days)

But *don't* do the following things:

- *Don't* turn on Virtual Memory in the Memory control panel. It severely hinders real time applications like Digital Performer.
- *Don't* use RAM Doubler™. It can cause problems with Digital Performer.

Choosing a studio size (number of tracks)

The *Studio Size* pop-up menu in the Easy Configuration section at the top of the window lets you choose the number of audio tracks — or simultaneous audio voices — available to you in Digital Performer. It also fills in the buffer size options in the Custom Configuration section below. The buffer sizes it chooses are not mandatory sizes, however. You can adjust them depending on your system.

As you choose various track counts from the menu, notice that larger track counts require larger buffers and, therefore, more RAM. If you choose a track count that is too high for your computer, Digital Performer will display the RAM needed in red to alert you that your computer will not be able to support that number of audio tracks. If you *almost* have enough RAM for a particular track count, you can try reducing the buffer sizes a little to see if you can "squeeze" them into the RAM available in your system. However, lowering buffer sizes too far can impact overall performance, as explained in the next section.

Customizing the studio configuration

The *Custom* section of the Studio Configuration dialog shown in Figure 3-13 lets you fine tune the studio size settings for your Macintosh system.

In general, you can freely experiment with the *Custom* settings in this dialog to optimize your track count and system performance. The worst thing that can happen is that Digital Performer will stop playing or recording and alert you at the moment your computer cannot keep up with the number of voices you've asked it to play and/or record. Fortunately, Digital Performer has been specially engineered to keep very close tabs on audio playback, and it is very good about notifying you when your computer can't keep up, even the slightest little bit. Unlike other audio sequencers out there, Digital Performer will never leave you guessing about whether all of your audio played back or not.

With this in mind, be sure to experiment before you get into a critical recording situation, as you don't want an alert to pop-up in the middle of a record pass!

Voices

This setting is the number of audio voices available in the Tracks window for audio tracks. This settings determines the number of tracks that can play back simultaneously in Digital Performer.

Digital Performer allows you to create an unlimited number of audio tracks. Of course, you'd like to have as many audio voices as you want, but you are limited by the performance of the following components of your Macintosh system:

- The speed of your Macintosh CPU
- The amount of available RAM
- Your hard drive performance
- Your computer's SCSI performance

A faster CPU, more RAM, a better hard drive and faster SCSI performance will allow more audio voices. A slower CPU, less RAM, a slower hard drive and SCSI performance will restrict you to fewer audio voices.

As explained in the following sections, you can sometimes achieve a higher number of audio voices by tweaking the buffer sizes.

Stereo buses

This setting determines the number of internal audio buses provided by the MOTU Audio System and seen in the audio pop-up menus in the Tracks window and Mixing Board. This value is fairly arbitrary and does not in itself affect system performance that much. The number of buses you actually *use*, however, may have an impact your system resources.

Disk read/write size

This setting determines the size of the blocks of audio data Digital Performer reads and writes to your hard drive.

Smaller read/write sizes are beneficial because the make Digital Performer more responsive when you do things like initiate playback. But the trade-off is that they produce more disk access activity, which puts more strain on your hard drive.

Larger read/write sizes ease up on disk activity, but they make the system less responsive (such as the amount of time it takes the program to start playing after you press the play button).

If you have a fast hard drive, you can probably get away with a smaller disk read/write size because your hard drive will be able to keep up with the increased disk access activity. Doing so will make your system as responsive as possible.

If, on the other hand, you have a slower hard drive, you will probably have to set this value higher, which will make your system less responsive.

If you have several hard drives, you can try placing audio files on several hard drives to distribute the work across several drives. This technique can help you lower the disk read/write size.

Buffer size per voice

The buffer size per voice is the maximum number of samples that can be queued for playback or recording. Smaller voice buffers require less RAM and therefore possibly allow you to increase the number of audio voices. However, small voice buffers also make your computer work harder during playback and recording at the risk of not being able to keep up.

If you would like more audio voices, reduce the voice buffer size and then try playing back one of your files. If your computer can't keep up, Digital Performer will immediately stop playing and alert you. You can then return to the Studio Configuration dialog to increase the voice buffer size and reduce the number of audio voices. You

can then repeat this procedure until you find a buffer size and number of voices that works on your computer.

This setting cannot be less than the disk read/write buffer setting.

In general, you should also try to make the voice buffer size larger (e.g. two to four times larger) than the disk read/write buffer size. This will improve Digital Performer's responsiveness and allow it to manage your system's resources with more flexibility and efficiency.

The RAM display

The RAM display at the bottom of the Studio Configuration window tells you what the current settings in the window require, as well as the total amount of RAM available in your computer for the MOTU Audio System.

The *minimum RAM required* and *RAM required for recording two tracks* settings will turn red if the amount of available RAM in the computer does not support the current settings in the window. If this happens, keep choosing a lower voice count until they are no longer red.

In case you are wondering, the *RAM available* amount is a combination of available RAM (as shown in the *About this Macintosh* window in the Apple menu) and a portion of the System software memory partition set aside for the MOTU Audio System. To maximize the amount of RAM available in this dialog, see "Free up as much RAM as possible" on page 18.

Fine-tuning audio input and output timing

Sound Manager adds slight timing offsets to audio that it records and plays back, and these offsets vary by type of Macintosh. Digital Performer detects what type of Mac it is running on and calibrates itself to compensate for these Sound Manager-induced offsets. Usually, the result is that audio plays perfectly in time with MIDI.

There may be some cases, however, where Digital Performer's automatic calibration won't quite be enough. Digital Performer ships with a file that lets you check Sound Manager timing on your computer. The file is a regular Digital Performer file located in the *Extras* folder in the Digital Performer folder, as shown below in Figure 3-14:

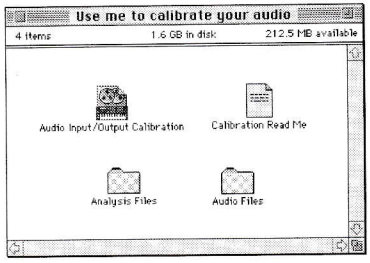

Figure 3-14: This Digital Performer 'calibration' project is located in the Extras folder inside the Digital Performer folder. Use it to make sure that audio is playing back precisely in time with MIDI on your Macintosh. Just open the file, assign the MIDI track to a General MIDI drum kit, press play, and listen for the audio and MIDI snare hits, making sure they play precisely together. If they flam, use the audio fine-tuning feature shown in Figure 3-15 to make them play exactly together.

Just open the calibration file, assign the MIDI track to a General MIDI drum kit in your MIDI rig, and press play. The file contains one MIDI track and one audio track. Both tracks contain quarter note snare hits placed precisely on each downbeat. They should play exactly together, with no flamming. Adjust the audio levels of the MIDI and audio signals so that when you listen, you can make a good comparison. It also helps to use a MIDI snare sound that closely matches the audio snare. Also try to use a dry snare sound.

In most circumstances, the MIDI and audio should play exactly in time with one another. But if you do hear flamming, Digital Performer lets you fine-tune the offset for the audio to get it to line up perfectly with MIDI. To do so, choose *MOTU*

Audio System Options>Fine-tune Audio I/O Timing from the Basics menu. Type in an offset in samples (try 100-sample increments at first) in the *Playback offset* option as shown in Figure 3-15, click OK and try playing again. Repeat this procedure until the MIDI and audio snare hits play together.

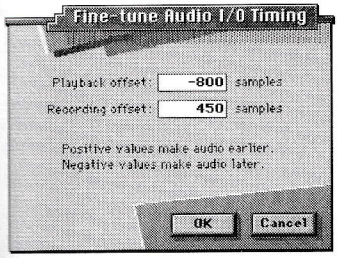

Figure 3-15: Fine-tuning the timing of audio playback and recording.

Once you have fine-tuned Sound Manager's playback offset, you can also fine-tune the *Recording offset*. To do so, you need to record the MIDI snare hits in the calibration file *back into* the file as audio and then compare the recorded version with the original, "live" MIDI version. Here's how you do this:

1 With the appropriate audio cable (or other audio connection), route the MIDI snare signal to the Macintosh's microphone input (or other Sound Manager input).

2 Record-enable the extra, empty audio track provided in the calibration file, and make sure its audio input assignment matches the input you are recording from.

3 Check your levels and get ready to record.

4 Press the record button and record several measures of the MIDI snare.

5 When you are finished recording, play back what you have recorded, comparing it to the original MIDI snare track as you listen. If you hear flamming, adjust the *Recording Offset* option in the Fine-Tune Audio I/O Timing dialog.

6 Repeat the procedure as many times as needed to fine-tune the timing.

Bouncing to play more tracks

Perhaps the best way to play more audio tracks is by using Digital Performer's Bounce to Disk feature, which takes any number of selected audio tracks and bounces them down to a single mono track or a stereo pair. For more information, see Chapter 8, "Bounce To Disk" (page 53).

Spreading audio files over several disks

Another way to improve audio performance is to spread your audio files over several hard disks. This makes it easier on each drive, making your system more responsive and possibly allowing you to be able to play more tracks.

Accelerating SCSI performance

There are numerous products available that provide accelerated SCSI performance. Examples include SCSI accelerator boards, RAID arrays, "AV" drives, and hard drives that support faster versions of the SCSI format. All of these devices will help you get more simultaneous audio tracks out of the MOTU Audio System — up to the limits of your Macintosh's CPU processing power. If you intend to purchase extra hardware to accelerate your computer's SCSI performance, also consider purchasing additional RAM as well to support the extra track buffers required by more tracks.

Choosing a lower sample rate

For CD-quality sound, you need to set the sample rate for Digital Performer to 44.100 KHz (in the Sound control panel). However, if you don't necessarily require this level of quality in your audio, you can greatly improve audio performance — as well as increase the number of simultaneous audio voices — by using 22.050 KHz instead.

What if your Macintosh just can't keep up

As mentioned earlier, you can experiment freely with the settings in the Studio Configuration dialog to maximize the number of tracks you can play and optimize responsiveness and overall system performance. If your Macintosh can't keep up with the settings you've made, Digital Performer will notify you immediately with an alert. And you can have some peace of mind when experimenting because Digital Performer is fairly strict about this. If it can't play so much as one sample because your computer can't keep up, it will immediately stop doing what it is doing (playing, recording, or whatever) and present an alert to you. You can then go back to the Studio Configuration window and try the following things:

- Reduce the number of audio voices
- Increase the disk read/write size
- Increase the buffer size per voice
- Increase the difference between the disk read/write size and the voice buffer size

No need to restart or quit after adjusting the Studio Configuration window

It is not necessary to quit Digital Performer or restart your computer after adjusting the settings in the Studio Configuration window. Changes will take effect immediately after you click OK, although it may take the MOTU Audio System a few seconds to make the necessary adjustments.

MONITORING SYSTEM PERFORMANCE

The *Performance monitor* shown below in Figure 3-16 can be opened by choosing *MOTU Audio System options* > *Performance Monitor* from the Basics menu.

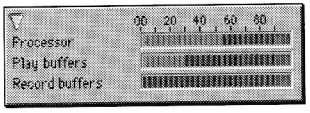

Figure 3-16: The Performance monitor window shows you how much of your Macintosh system resources are being used. If the meters reach yellow, you should consider reducing the number of audio voices you are asking it to play.

This window displays a meter for the processor resources of your Macintosh, as well as the playback and recording buffers in the MOTU Audio System. If any of the meters approach yellow, you should consider reducing the number of voices in the Studio Configuration dialog as described in "Choosing a studio size (number of tracks)" on page 28.

CHAPTER 4 Audio Effects

OVERVIEW

When you are using the Macintosh's built-in sound capabilities and the MOTU Audio System, Digital Performer 2.1 provides real-time effects plug-ins, including reverb, dynamics processing and EQ. The effects can be applied to audio tracks via the five effects inserts for each audio track in the Mixing Board. The number of effects inserts you can apply at any one time depends on your Macintosh hardware. There is no built-in limit.

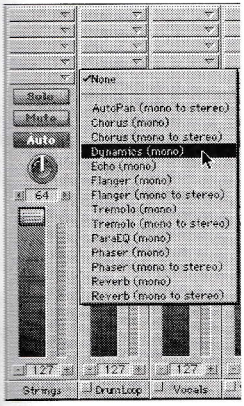

Figure 4-1: Digital Performer 2.1 provides real time effects plug-ins for audio tracks. Shown here are the mono and mono-to-stereo versions. Stereo versions are also provided on stereo tracks.

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REAL TIME EFFECTS PLUG-INS

Digital Performer 2.1 ships with the following real-time effects plug-ins, all developed at Mark of the Unicorn. All are supplied in both mono and stereo versions, with a few mono-to-stereo versions as well (as noted below):

- AutoPan
- Chorus
- Dynamics (compressor, expander, limiter, gate)
- Echo
- Flanger
- Tremolo
- Parametric EQ (peak/notch, high/low shelf, high/low pass)
- Phaser
- Reverb

Mono-to-stereo versions are also supplied for AutoPan, Flange, Tremolo, Phaser and Reverb.

TDM AND PREMIERE PLUG-INS

For information about using TDM plug-ins in Digital Performer, see "Working with TDM" on page 120 of the Digital Performer *Guide to Digital Audio.*

For information about using Premiere plug-ins in Digital Performer, see chapter 6, "Premiere Plug-ins" (page 49) in this guide.

WHERE THEY RESIDE ON YOUR HARD DRIVE

Digital Performer 2.1's real time effects plug-ins reside in the Plug-ins folder inside the MOTU Folder, which the installer places in the Extensions

Folder inside your System Folder. The real-time plug-ins folder must be in the same folder as the MOTU Audio System.

☛ Digital Performer's real time plug-ins are placed in a different folder than Premiere plug-ins. Real time plug-ins are placed in the MOTU folder, which resides in the Extensions folder inside your System Folder. Premiere plug-ins should be placed in the Plug-ins folder that resides in the same folder as Digital Performer itself.

For convenience, you may want to place an alias of the real time plug-ins folder in your Digital Performer folder, which gives you access to all plug-ins (real-time and Premiere) from one location.

USING REAL-TIME AUDIO PLUG-INS

Applying real-time audio plug-ins to your audio tracks is straightforward: just choose the desired plug-in from one of the insert pop-up menus for the track in the Mixing Board as shown in Figure 4-1 on page 33. The Effects window appears with the settings for the plug-in. If the Effects window is already open, you can choose the effect from the pop-up menu provided at the top of the window.

All of the features in the Effects window apply to real-time audio effects, including using the Bypass button to temporarily remove the effect. See "Audio Effects inserts" on page 119 of the Digital Performer *Guide to Digital Audio* for details about using the Effects window.

APPLYING EFFECT PRESETS

Digital Performer 2.1 provides a variety of factory presets for many of the MOTU Audio System effect plug-ins. Presets are found at the bottom of the Effect window mini-menu when the desired effect is being displayed in the window. For example, when the Effects window is showing the reverb plug-in, you'll see reverb presets in the mini-menu.

Effects presets are stored in Digital Performer files. When you create a new file in Digital Performer 2.1, you'll see the factory presets that are shipped with Version 2.1. Files that you originally created in an earlier version of Digital Performer will not have any presets in them until you load them from a file that does. If you don't see any presets, load them from another file that was originally created in Digital Performer 2.1.

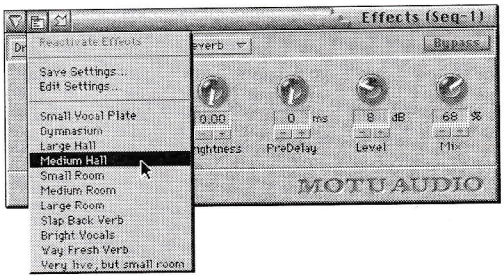


Figure 4-2: Effects presets are located in the Effects window mini-menu. The menu only displays presets for the type of effect currently displayed in the Effects window. This example shows the reverb plug-in and reverb effects presets in the menu.

BUSING, MASTER FADERS & AUX TRACKS

The MOTU Audio System provides a flexible virtual mixing environment. You can take advantage of features like the internal audio buses to apply effects as needed and even conserve your computer's processing power by busing multiple tracks to the same effect insert. You can also apply effects to aux tracks and master faders as pre fader effects. For details, see chapter 14, "Mixing Digital Audio" (page 117) in the *Guide to Digital audio* for more ideas about how to work with Version 2.1's new audio effects within Digital Performer's virtual mixing environment.

MONITORING SYSTEM PERFORMANCE

Real-time audio effects can require a significant amount of CPU bandwidth (your computer's processing power). The speed of your computer determines how many effects you will be able to

apply at one time. Use the *Performance monitor* window to keep an eye on how much of your CPU bandwidth you are using up with your plug-ins.

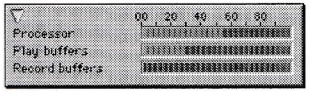


Figure 4-3: The 'Processor' meter in the Performance monitor shows you how much of your Macintosh processing power is being used by the MOTU Audio System and the real-time effects plug-ins that are currently active. If any of the meters reach yellow, you should consider reducing the number of plug-ins you are using.

The *Performance monitor* can be opened by choosing *MOTU Audio System options* > *Performance Monitor* from the Basics menu.

Some effects use virtually no bandwidth when bypassed. Others may require some bandwidth when bypassed, but generally much less than when they are active.

COPYING AND PASTING EFFECT SETTINGS

As with MIDI effects, you can copy and paste audio effect parameters from one insert to another. Just choose Copy from the Edit menu while a specific insert's effect is being displayed, switch to a different insert with that same effect, and choose Paste.

You can copy and paste between variants of the same effect. For example, you can copy between a mono effect and its stereo counterpart. You can also copy from a 2-band EQ, for example, and a 4-band EQ.

SAVING AND LOADING EFFECT SETTINGS

In addition to copying and pasting effect settings, you can also name, save and recall them. You can also use the Load command in the File menu to load effect settings from other files. You can save and load any type of effect setting: MOTU audio effects, MIDI effects and TDM effects.

To save an effect setting, choose *Save Settings* from the Effects window mini-menu.

To apply the saved setting, choose the effect type in the Effects window, and then choose the desired effect setting by name from the lower portion of the mini-menu. Only settings for that type of effect appear in the mini-menu. For example, you won't see Flanger settings in the mini-menu when the Effects window is currently displaying the Reverb effect.

To load effects settings from another file, choose Load from the File menu, choose the file, and then in the Load dialog, check the "Effect Settings" check box before clicking OK.

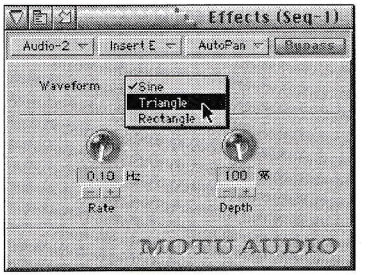
THE EFFECTS

The following sections discuss the settings for each individual effect.

The Mix setting

For effects that have it, the *Mix* setting controls how much of the effected signal is included. In the effect presets that are included with Digital Performer, Mix is set to 50% for in-line use; if you are applying the effect to a dedicated bus/aux track, you should set the mix to 100%.

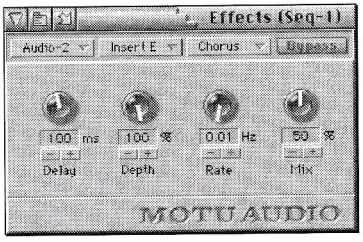
AutoPan



AutoPan is a mono-to-stereo or stereo effect. It controls the track's pan in the same way as the pan knobs in the Mixing Board. AutoPan modulates the pan between the left and right channels. The *Waveform* determines the shape of the modulation. *Rate* controls the frequency at which the pan is

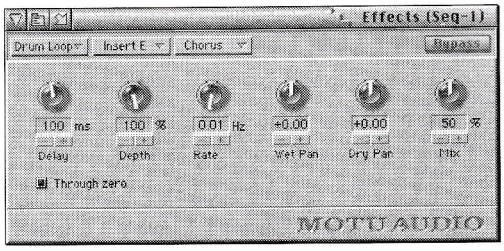
modulated. *Depth* controls the maximum amount of pan. When Depth is 100%, the output pans from full left to full right.

Chorus (mono)



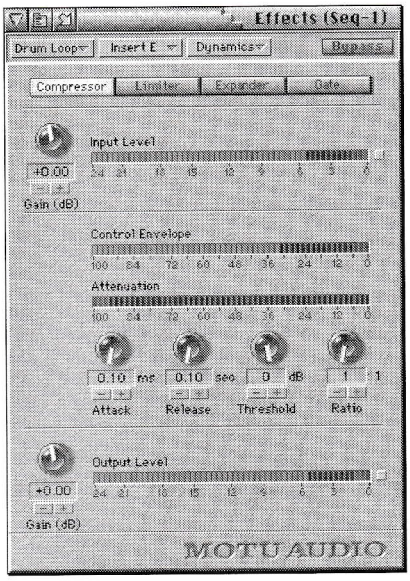
Chorus creates its effect by mixing the input with a delayed version of itself. The amount of delay is centered around the *Delay* setting. *Depth* and *Rate* control the modulation of the delay around the *Delay* setting.

Chorus (stereo and mono-to-stereo)



The mono-to-stereo and stereo variants of Chorus have additional parameters. Use the *Wet Pan* and *Dry Pan* settings to control the pan of the wet and dry signals independently. The *Through zero* option allows you to delay the dry path as well. When you choose this option, the wet signal can come before or after the dry signal, which can often enhance the effect.

Dynamics



There are four types of Dynamics processors available: (downward) compressor, limiter, (downward) expander, and gate.

Compressor

The *Compressor* lowers the level of the input when it is above the threshold. The amount of attenuation is determined by the *Ratio* and the input level. If the input is 6 dB above the *Threshold* and the Ratio is 3:1, then the output will be 2 dB above the Threshold. When the input level goes above the threshold, the attenuation is added gradually to reduce distortion. The rate at which the attenuation is added is determined by the *Attack* parameter. Likewise, when the input level falls below the Threshold, the attenuation is removed gradually. The rate at which the attenuation is removed is determined by the *Release* parameter. Long Release times may cause the audio to drop out briefly when a soft passage follows a loud passage. Short Release times may cause the attenuation to pump when the average input level quickly fluctuates above and below the Threshold.

Limiter
The *Limiter* is similar to the Compressor, except there is no Ratio control. When the input level goes above the Threshold, the output plateaus at the Threshold level.

Expander
The *Expander* is the opposite of the Compressor: it increases the dynamic range. Inputs under the threshold are attenuated, and inputs above the threshold are passed straight through.

Gate
When the input to the *Gate* falls below the threshold, the output is muted entirely.

Input level
The *Input Level* meter displays the peaks of the input signal after the Input Gain is applied. The Threshold control is calibrated to 0 dB on the Input Level meter. Since the MOTU Audio System has virtually unlimited headroom without signal degradation, it is possible to have an input signal above 0 dB. Use the Input Gain to adjust the input level before adjusting the other controls.

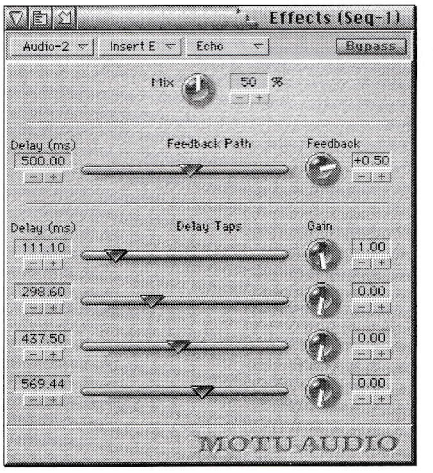
The input level of the stereo dynamics processor is the maximum of the left and right channels.

Control envelope
The *Control Envelope* meter is much like the Input Level meter, except it displays the time averaged envelope of the input, not the peaks. The Control Envelope is compared to the Threshold by the processor to determine the attenuation. The Control Envelope meter range is -100 dB to 0 dB, the full range of the Threshold control.

Attenuation
This level meter displays the current amount of attenuation applied by the effect.

Output level
The *Output Level* meter displays the peaks of the output signal. The Output Gain is applied before the Output Level meter. Use the Output Gain to compensate for the effect of the dynamics processing.

Echo



There are two serial stages to the Echo effect: the *Delay Taps* and the *Feedback Path*.

Delay Taps
Each of the *Delay Taps* creates a single repetition of the input signal at the specified delay and with the specified gain.

At least one of the Delay Taps must have a nonzero gain for the wet signal to be nonzero.

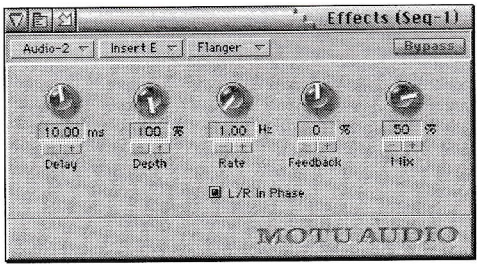
You can make a four echo pattern by setting each of the Delay Taps.

Feedback Path
The outputs of each of the Delay Taps are feed into the *Feedback Path*.

The Feedback Path creates a series of equally spaced echoes. Each successive echo is a scaled version of the previous echo. The scale factor is

controlled by the Feedback value. When the Feedback value is zero, the output of the Delay Taps will pass straight through unaffected. When the Feedback value is one or negative one, the echoes will continue forever at a constant signal level.

Flanger

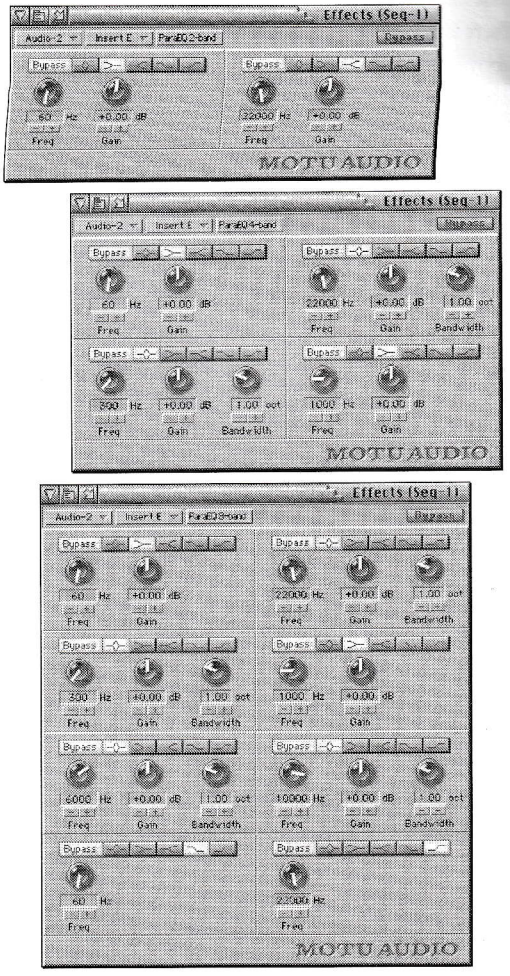


The Flanger creates its effect by mixing the input with a delayed version of itself. The amount of delay is centered around the *Delay* setting. *Depth* and *Rate* control the modulation of the delay around the Delay setting.

The *Feedback* control adds some of the output back into the input.

The mono-to-stereo and stereo variations of the Flanger effect have an additional check box labelled *L/R In Phase*. When this option is selected the amount of delay applied to both left and right channels is the same When this option is not selected, the large delays are applied to the left channel when small delays are applied to the right channel, and vice-versa.

ParaEQ (parametric equalization)



The ParaEQ (parametric equalization) effect comes in six variants: 2,4, and 8 bands of mono or stereo EQs. Regardless of how many bands you have displayed, only the non-bypassed bands cost processing power. Each band can be one of the following filter types:

- peak/notch
- low shelf
- high shelf

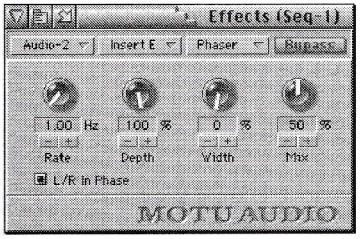
- low pass
- high pass

The peak/notch filter has three parameters: *center frequency* in Hertz, *gain* in decibels, and *bandwidth* in octaves. Peak/notch filters can be used to boost or cut a continuous region of frequencies.

The low and high shelf filters have two parameters: *edge frequency* in Hertz and *gain* in decibels.

The low and high pass filters have a single parameter: *cutoff frequency* in Hertz.

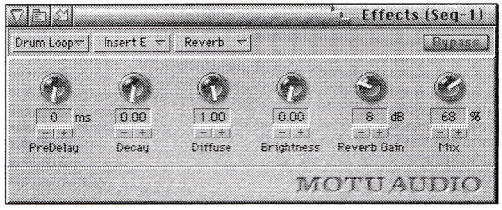
Phaser



The phaser creates it's effect by sweeping notches up and down the frequency spectrum. *Rate* controls the rate at which the notch center frequencies are modulated. *Depth* controls how far the notches sweep. *Width* controls the bandwidth of the notches, within a range determined internally. When Width is 100%, the bandwidth is set to the maximum allowed value.

The mono-to-stereo and stereo notches have a check box to labelled *L/R In Phase*. When this option is selected the center frequencies of the notches applied to the left and right channels are the same. When this option is not selected, high frequency notches will be applied to the left channel while low frequency notches are applied to the right channel, and vice-versa.

Reverb



Predelay determines the time between the dry signal and the first echo in the wet signal.

Decay determines the length of the reverberation tail.

Diffuse determines the smoothness of the reverberation. Low Diffuse values create more distinct echoes in the reverberation.

Brightness determines frequency dependence of the reverberation. High values of Brightness result in less reverberation of high frequencies.

Low values of Brightness result in more reverberation at high frequencies, and thus a muddier reverberation.

Reverb Gain is additional gain applied to the wet signal which can be used to compensate for the effects of the other controls.

CHAPTER 5 The Samplers Window

OVERVIEW

Digital Performer 2.1 has a new window called the *Samplers* window. This window lets you connect a sampler to your Macintosh as a SCSI device and then use drag and drop techniques to transfer audio from the sampler onto your Mac hard disk (in Sound Designer II file format) and vice versa (from the Mac into the sampler). You can also drag and drop audio between the sampler and any window in Digital Performer that holds audio, such as the Audio Graphic Editor, the Soundbites window, audio track event lists, etc.

This feature brings together the worlds of sampler-based audio and hard disk-based audio, allowing you to easily transfer sounds between the two environments so that you can take advantage of the inherent strengths offered by each one.

The Samplers window and the drag and drop features that go with it are called *Sample System*.

This chapter describes how to configure your system, how to use Sample System, and how to get your sampler(s) and your computer to cooperate on the Macintosh SCSI bus.

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LIST OF SUPPORTED SAMPLERS

Many models of samplers on the market today have the ability to transfer samples via SCSI. Some even support an industry standard for SCSI-based sample transfers called *SMDI* (pronounced "smiddy"), which stands for *SCSI Music Data Interchange*. But in almost every case, even the ones that support SMDI have unique individual characteristics that require device-specific engineering in Digital Performer.

As a result, Digital Performer 2.1 has been specifically engineered to support the models of samplers listed in the table below. Look for other models in future updates of Digital Performer.

Manufacturer	Models supported	Minimum system version needed
AKAI	S3200	1.30
	S3200XL	1.50
	CD3000XL	1.52
	S3000XL	1.50
	S2800	2.00
	S2000	1.51
E-mu Systems	E4xturbo	2.50f
	E4x	2.50f
	E4	2.50f
	E6400	2.50f
	ESI-32	2.10f
Kurzweil Systems	K2000	2.31
	K2500	2.31
Roland	S-760	2.24

CONNECTING YOUR SAMPLER(S) VIA SCSI

Even if you are already a seasoned SCSI veteran, try to learn as much as you can from your Macintosh and Sampler documentation about SCSI and how SCSI devices connect to the Macintosh.

What is SCSI?

SCSI stands for *Small Computer Serial Interface*. It is a relatively high-bandwidth communications standard developed by the computer industry to allow computers and hardware peripherals to communicate with each other.

A guerilla guide to SCSI

While the following list is by no means complete, here are a few basic rules of thumb to follow when connecting SCSI devices to your Macintosh:

- SCSI provides 8 unique device IDs on a given SCSI chain. On a Macintosh, IDs 0 and 7 are almost always reserved for the Macintosh mother board and internal hard drive.

- The rule above means that you are left with IDs 1 through 6 to assign to your sampler and other SCSI devices in the chain (hard drives, CD-ROM drives, CDRs, etc.)

- Given the two rules above, each SCSI device must be assigned a unique ID between 1 and 6. SCSI IDs are often set on the rear panel of the device, but most samplers usually do so from their front panel. Consult the documentation for your SCSI device(s) and sampler(s) for details.

- Make absolutely sure that your sampler and other SCSI devices are not set to ID 0 or 7, and that they do not share an ID with any other device on the chain.

- A chain of more than two SCSI devices must have SCSI termination at the end of the chain opposite the computer. Some devices provide internal termination, which is often enabled via a dip switch or jumper. If the device at the end of the chain has no internal termination, you must use an external SCSI terminator attached to the extra SCSI connector on the device. See your computer dealer for the purchase of a SCSI terminator.

- Some devices, especially some samplers, work more reliably when they are the last device in the SCSI chain. Consult their documentation.

- Never connect or disconnect devices from the SCSI chain without first turning off all devices on the chain. Hot swapping SCSI devices can have dire consequences (i.e. fatal hardware failure, hard disk crashes, etc.).

- Try to use the shortest SCSI cables possible. As a rule of thumb, try to keep the total length of the SCSI chain less than twelve feet.

- Since you are using SCSI in an audio environment, use the best quality, shielded SCSI cables you can afford. SCSI can easily introduce noise in your studio. Keep line level audio as far away from SCSI cables and devices as possible.

The most important SCSI rule of all

The most important rule about SCSI is to follow directions. Not doing so can cause hardware failure.

Using devices with only one SCSI connector

Most SCSI devices have two connectors so that they can be placed in the middle of a SCSI chain. Some samplers, however, only have one SCSI connector. Examples include including the Roland S-760 and the AKAI S3200.

In cases like this, you can work around this limitation by purchasing a special SCSI adaptor that connects to the device and supplies two connectors, which allow you to continue the SCSI chain beyond the device.

☛ Caution: check with the sampler manufacturer before using such an adaptor to avoid incompatibility problems.

CONFIGURING FREEMIDI

After confirming that your sampler is in the "List of supported samplers" on page 41, configuring FreeMIDI is simple:

1 Create a device for your sampler in your FreeMIDI setup.

2 Make sure the device is properly identified by manufacturer and model name as shown below. These predefined devices have all of the necessary device properties and internal ID information that Digital Performer needs to communicate successfully with the device. You can type in any name you wish for the sampler.

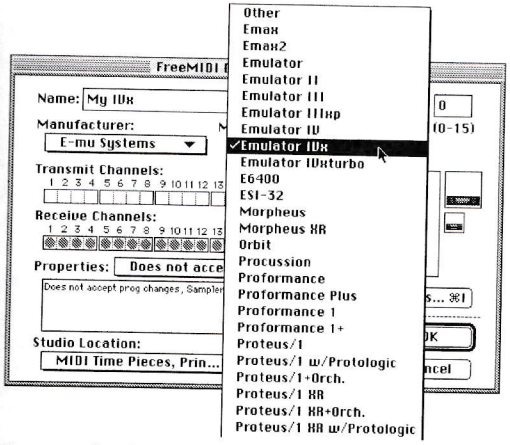

Figure 5-1: Identify your sampler by manufacturer and model from the device info pop-up menus, as demonstrated here for the E-mu EIV. Doing so ensures that Digital Performer will be able to communicate successfully via MIDI with the sampler.

3 Make sure the device has the proper MIDI connections to the MIDI interface in your setup.

To confirm that you have successfully established MIDI communication with the sampler, load some samples into the sampler and trigger them from a Digital Performer sequence.

CONFIGURING THE SAMPLER

Make sure you turn on each sampler and configure it before you turn on your Mac. Also make sure that you have two-way MIDI connection to each sampler as described in the previous section. The following sections discuss specific issues with each model of sampler.

Configuring the Roland S-760

Check to make sure your S-760 has the operating system version shown in the "List of supported samplers" on page 41 (or higher).

There are three steps to configure the S-760:

1 Make sure the S-760 can receive system exclusive data. To do this, go to System mode from the top level menu, push the *value/menu* button, go to MIDI setup mode and set exclusive RX to ON.

2 Set the SCSI ID of the S-760 to something between 1 and 6. Make sure that it does not conflict with other SCSI devices. To set the SCSI ID, go to System mode from the top level menu, go to SCSI setup mode and set the Self SCSI ID.

3 Make sure the S-760 is in Performance mode.

Problems you may encounter with the S-760

Keep in mind that the S-760 is not visible to the Macintosh unless it is in Performance mode. If you need to browse other screens in the S-760's front panel LCD, make sure you return to Performance mode before you try and interact with the sampler from Digital Performer. Also, if you remain in another LCD screen long enough, the S-760 may appear empty in Digital Performer's Samplers window.

The Roland S-760 is very slow to react to changes. Therefore, the sampler may be inactive for long periods of time after you interact with it via Sample System.

Sometimes, the S-760 does not successfully receive messages from Digital Performer. This is most obvious when deleting samples. In this case, the sample will disappear when you delete it and reappear a few minutes later when Digital Performer updates its window while re-scanning the sampler.

Also, the S-760 can cause the Macintosh to lock up while it deletes a sample. This will occur if you upload a sample that has the same name as an existing sample. If this happens, *don't restart your Mac*! When the S-760 is finished deleting the sample, it will unlock the Macintosh.

Make sure that you do not cause the S760 to scan the SCSI bus as described in your Roland S-760 manual. The 760 can lock up your Mac when it scans.

Configuring the K2000 and K2500

Check to make sure your Kurzweil sampler has the operating system version shown in the "List of supported samplers" on page 41 (or higher).

Make sure that the K2000 or K2500 is occupying an otherwise unused SCSI ID number and that its external drive is not set to a used SCSI ID.

If you are unable to upload or download samples, make sure your model of K2000 supports sample uploading and downloading. For further information, check with Kurzweil.

Kurzweil samplers display the amount of memory used by samples and the largest unused block available for an uploaded sample. These numbers often do not add up to the total amount of memory in the sampler. For example, you may begin with 450K used and 1,000K free, and then upload a 1,000K sample, only to find that it now reads 1,450K used and 600K free.

Configuring AKAI samplers

Check to make sure your AKAI sampler has the operating system version shown in the "List of supported samplers" on page 41 (or higher). This is very important with the AKAI samplers. Earlier versions of the operating system did not properly interact with the Macintosh and SCSI and could cause hard disk crashes when using AKAI samplers on the SCSI bus.

Make sure that the sampler is occupying an otherwise unused SCSI ID number and that its external drive is not set to a used SCSI ID. You can set the SCSI ID of the sampler by pressing the DISK button on the front panel. Be sure to do this before your Mac is turned on, because the sampler can cause your Mac to hang when you are in DISK mode.

Problems you may encounter with AKAI samplers

In our experience, using AKAI samplers disk mode can cause the Macintosh to lock up.

Interaction with Digital Performer can cause the AKAI sampler to flash different samples in the front panel display. Occasionally the sample that is left showing is not the actual active sample. This can be dangerous if you immediately delete a sample that is showing in the window using the buttons on the front of the sampler. Its a good idea to move the knob that selects the sample to allow it to update the display before you do any interaction that might cause you to lose data.

SAMPLE SYSTEM BASICS

Sample system has four primary functions:

1. It shows the current state of the sampler, e.g. loaded samples and available memory.

2. It allows you to transfer Digital Performer soundbites and Sound Designer II files in and out of the sampler, and transfer samples between samplers.

3. It allows you to rename samples in a sampler.

4. It allows you to delete samples in a sampler.

THE SAMPLERS WINDOW

The sample system appears as a Samplers window in the Digital Performer Windows menu. Each sampler shows up as a horizontal bar in the sampler window.

You can open a sampler by turning the disclosure triangle on the far left of the sampler bar. Opening a sampler will show all of the samples currently loaded into the sampler.

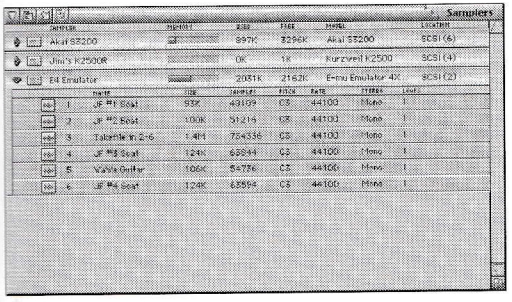

Figure 5-2: Digital Performer's Samplers window. In this example, three samplers are connected to the Macintosh: AKAI S3200, Kurzweil K2500R, and the E-mu Systems EIV. The EIV has been opened with the disclosure triangle at the far left to show the samples currently loaded in the EIV. The name of the sampler comes from the name you give it in FreeMIDI. The other information is obtained by Digital Performer when it scans the sampler.

Samplers window columns

From left to right, each sampler bar shows:

- The disclosure triangle, used to open and close the sampler.
- The sampler's icon.
- The sampler's name, which it gets from the name of the sampler in FreeMIDI.
- A gauge that shows the amount of memory currently used in the sampler. As you add samples to the sampler the gauge will increase from left to right.
- The amount of memory used in the sampler.
- The amount of bytes available for use.
- The manufacturer and model name of the sampler.
- The SCSI ID of the sampler.

Samples

Samples appear below each sampler bar when the sampler is opened with its disclosure triangle to the left of its name as shown for the EIV in Figure 5-2 above. Several parameters are displayed for each sample from left to right as follows:

- The sample number, if the sampler stores samples by number.
- The sample name. Each name shows up in a format that follows the naming conventions for that sampler. For example, AKAI samplers store names in uppercase with 12 characters allowed for a name. Roland samplers allow 12 characters with a three character prefix followed by a colon.
- The Size of the sample in bytes. Some examples are 40b, for forty bytes, 35K for 35000 bytes, or 2.1M for 2.1 megabytes.
- The size of the sample in number of samples.
- The root pitch of the sample.
- The sample rate, in samples per second.
- The number of channels of the sample, either Mono, or Stereo.
- The number of loops in the sample.

Samples can be selected by clicking on the sample. Shift-click to select multiple samples.

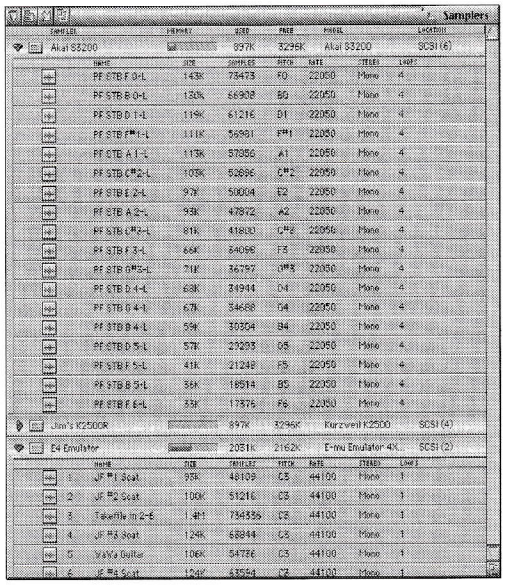

Figure 5-3: Here, both the AKAI 3200 and E-mu EIV are opened to display all of the samples currently loaded in their memory. All of the samples shown in the EIV originated as Sound Designer II files in Digital Performer and have been uploaded to the EIV by dragging and dropping them from the Soundbites window into the Samplers window. Notice that one of them is a 1.4 Mb takefile originally recorded in Digital Performer.

TRANSFERRING SAMPLES

Samples are transferred by dragging to or from the samplers in the Samplers window.

Simple Transfers

The simplest way to transfer a sample is to drag a soundbite from the soundbites window on to a sampler. You can drop a sample on the closed sampler bar or anywhere within the sample display. The sampler will highlight if it can accept the item that you are dragging. If the sampler does not have enough memory to accept the sample, the memory gauge on the sampler bar will appear red and full when you drag an item over the sampler.

You can also transfer samples from the Samplers window into the soundbites window, into an audio track in the tracks overview, into an audio track in the audio graphic editor, or into an audio tracks event list window.

Background processing

When you transfer samples, a task will appear in the Background Processing window. This allows you to continue working while Digital Performer transfers samples in the background. You can also pause, cancel and reorder transfer tasks in the list in the Background Processing window. If you reorder a sampler transfer task that is in the process of transferring, it will cancel the current transfer and start it again once the task comes up in your new order. Keep in mind that if you are transferring a long sample and you pause it and move it back in the task list, all of the data transferred by that task will be deleted from the sampler and the task will restart from the beginning. There is no such penalty for reordering transfer tasks that have not yet begun transferring.

For more information, see chapter 20, "The Background Processing Window" (page 147) in the Digital Performer *Guide to Digital Audio.*

Sample parameters

If you transfer a sample out of a sampler and then later restore that sample to the same model sampler, without editing the sample, it will maintain all of the sample's parameters for the sampler model that the sample came from.

Batch Transfers and transferring to/from the MacOS Finder

You can drag Sound Designer II files from the desktop or from any open Finder window directly into a sampler, or any of the locations listed above that accept soundbites. This allows you to batch transfer many samples into or out of a sampler. If

you select more than one sample in the sampler by shift clicking and then drag to any location, all of the selected samples will download.

You can also drag samples or soundbites from their respective windows into the MacOS Finder window or the desktop. When doing so, a copy of the sample or soundbite is made. So keep in mind when doing so that you are actually duplicating the data on your hard drive: dragging and dropping into the finder makes a copy of the original audio, which is already stored somewhere else by Digital Performer.

Transferring Between Samplers

You can drag samples from one sampler to another. This will download the Sample to your Mac's hard disk and then transfer them back to the destination sampler. For this reason, each sample appears in the Soundbites window. When you transfer a sample between different sampler models, Digital Performer does its best to maintain the sample's parameters. However, due to differences in sampler architectures, not all of the parameters can be transferred. Often, loop points, envelopes, and other sample parameters must be edited once the sample arrives in the sampler.

Applying PureDSP and Premiere plug-in processing to samples

When a sample has been transferred to Digital Performer, you can apply any of Digital Performer's PureDSP processing on it, such as time scaling, sample rate conversion, and pitch shifting. You can also apply Premiere plug-ins to the sample. In both cases, Digital Performer creates new sound files, as usual, on your hard drive, which you can freely load back into your sampler at any time. The original sample (in its sound file form) is preserved.

Sample loop points

When applying PureDSP or Premiere plug-in processing on a sample, Digital Performer does its best to maintain your sample's loop points. However, it is very likely that you will want to edit you loop points after restoring the sample to the sampler. Also, Digital Performer now supports Sound Designer II loop points. So you can now use an external editor to edit your loop points and Digital Performer will transfer those to and from the sampler.

Renaming

Any sample can be renamed by option-clicking the sample's name and typing a new name. The arrow keys can be used to move the pop-up text edit box to adjacent sample names. A mouse click or the return key will exit name editing.

Deleting

There are two ways to delete samples:

1. You can select a sample or a group of samples and press the delete key, which is equivalent to choosing Clear from the edit menu.

2. You can also drag samples into the Trash on the Macintosh desktop.

SAMPLERS WINDOW MINI MENU

The sample system mini menu contains two items:

Rescan SCSI devices

This mini-menu command causes the Sampler window to rescan all of the devices connected to your SCSI chain. This is very helpful for samplers that only respond to SCSI in certain modes. The Roland S-760, for example, will not respond to SCSI unless you are in Performance mode. It is easy to move around the screens in the front panel and then forget to set it back to Performance mode when you fire up Digital Performer. If the S-760 doesn't show up, this is probably the cause. Once

you set it back to Performance mode you can use Rescan SCSI devices to cause the Samplers window to find it on the SCSI chain.

Remap samplers to MIDI devices

This allows you to change the pairing of samplers on SCSI to devices in FreeMIDI. If Digital Performer cannot determine which MIDI device corresponds to each SCSI device, it will let you remap MIDI devices to your samplers.

GENERAL TROUBLESHOOTING

Problem	Solution
Noise on the line. Clicks or buzzes when transferring samples.	Move audio cables away from SCSI cables.
No samplers show up in the samplers window.	Make sure your sampler is one of the samplers that is supported by the Sample System. Make sure that there are no SCSI ID conflicts. Make sure that any of the sampler's internal settings are set for use as a SCSI client. SCSI probe software is very helpful for analyzing these problems. If your sampler shows up using a SCSI probe and it is a model that we support and it still doesn't show up, contact Mark of the Unicorn technical support.
You see an alert that says "The following samplers do not have a corresponding FreeMIDI device."	This means that the sample system has found a sampler connected to your SCSI port that it can not find in your FreeMIDI setup. Go to the FreeMIDI Setup program and add a device for this sampler. Make sure that its sampler attribute is checked. Also make sure the sampler itself is configured as described above.

CHAPTER 6 Premiere Plug-ins

WHAT IS A PREMIERE PLUG-IN?

Adobe Premiere plug-ins are third-party audio processing modules that support the Adobe Premiere plug-in format. Digital Performer 2.1 supports this format, allowing you to apply any third-party Premiere plug-in to your audio directly within Digital Performer.

Digital Performer 2.1 includes two Premiere plug-ins developed by Mark of the Unicorn: Invert Phase and Reverse. There are many other third-party plug-ins that you can purchase separately from developers such as Arboretum Systems, Waves, Invision, and others.

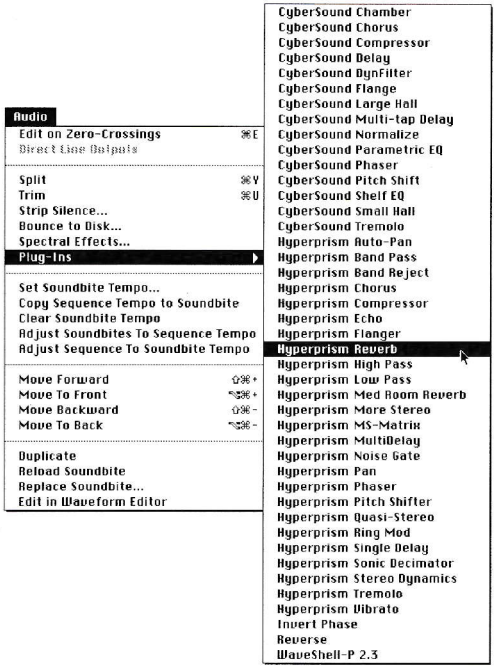

Figure 6-1: Examples of third party Premiere plug-ins in Digital Performer's Audio menu.

NON-REAL TIME, DISK-BASED PROCESSING

Premiere plug-ins employ disk-based processing that is not real time. (For real-time effects, see chapter 4, "Audio Effects" (page 33) in this Guide.) When you apply a Premiere plug-in to a soundbite in Digital Performer, a new audio file is created on your hard drive that consists of the original material with the plug-in effect applied to it. The effect cannot be removed (because it is part of the audio at this point), although you can, of course, replace the affected soundbite with the original, unaffected one (as long as you haven't deleted it from your hard drive).

BACKGROUND PROCESSING

In Digital Performer, Premiere plug-ins are processed in the background, just like Digital Performer's PureDSP pitch-shifting, time-scaling, spectral effects and sample rate conversion features. As soon as you apply a Premiere plug-in effect, the task is queued up in the Background Processing window, allowing you to go on with your work.

See chapter 20, "The Background Processing Window" (page 147) in the Digital Performer *Guide to Digital Audio* for details about background processing.

PREVIEWING

Previewing is supported for plug-ins that provide it. Previewing allows you to hear the first few seconds of the audio you have selected for processing with the effect applied to it. Not all Premiere plug-ins support previewing. Check your plug-in documentation for details.

Previewing always uses Sound Manager, even if Digital Performer is using DAE. So you will always hear preview audio from your Mac speaker, not from the outputs of your Digidesign hardware.

UNDO

The application of a Premiere plug-in is undoable, just like any other action in Digital Performer. As soon as you do something else, it is no longer undoable with the Undo command.

INSTALLING PREMIERE PLUG-INS

Premiere plug-ins will automatically appear in Digital Performer as long as they are placed in the *Plug-ins* folder that resides in the same folder as Digital Performer itself.

☛ Premiere plug-ins are placed in a different folder than Digital Performer's real-time plug-ins. Real time plug-ins are placed in the MOTU folder, which resides in the Extensions folder inside your System Folder. Premiere plug-ins should be placed in the Plug-ins folder that resides in the same folder as Digital Performer itself.

If you are also using your Premiere plug-ins with programs other than Digital Performer, make copies of the plug-ins and place them in Digital Performer's plug-ins folder.

Premiere plug-ins must be in Digital Performer's plug-ins folder when you open the program. To add a new plug-in, you need to quit and reopen.

Most Premiere plug-ins can be installed in 68K, PowerPC or FAT versions. On a Power Mac, all three formats work fine in Digital Performer. On a 68K Mac, only 68K or FAT versions will appear in Digital Performer's Plug-ins menu.

APPLYING A PREMIERE PLUG-IN

To apply a Premiere plug-in:

1 Select the audio you wish to process.

You can use any one of many methods for selecting audio. You can even select multiple soundbites at one time.

2 Choose *Plug-ins* from the Audio menu, and then choose the desired plug-in from the sub-menu.

3 If the plug-in supports previewing, you can preview with the plug-in window open.

4 Click OK to apply the plug-in effect.

CHAPTER 7 Soundbite Layering

Digital Performer 2.1 improves the way that audio is handled in the graphic editing window. Accordingly, some of the basic rules for audio recording, playback, viewing and editing are different from earlier versions.

BETTER CONTROL OF OVERLAPPING SOUNDBITES

In previous versions of Digital Performer, if soundbites overlapped, the soundbite that started later would always take over playback from the earlier soundbite. Now you can choose which soundbite will play by choosing which one is displayed on top. The top-most soundbite will always be the one that plays.

LAYERING COMMANDS

Four new commands (*Move Forward, Move To Front, Move Backward*, and *Move To Back*) give you total control over the layering of soundbites. These commands work just like the equivalent commands in graphics programs such as Macromedia FreeHand™ or ClarisWorks™.

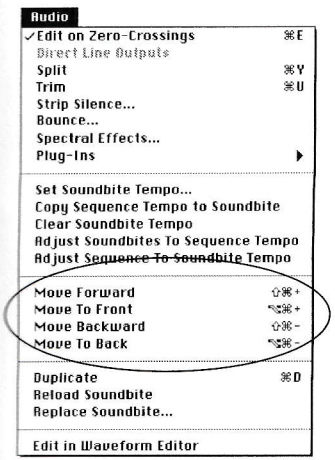

Figure 7-1: The commands for managing soundbite overlapping.

AUDIO RECORDING

Audio recording now works just like recording on tape. If you punch-in while in overdub mode, the newly recorded soundbite now appears on top, and will always play in place of the old material. If you punch-in while in replace mode, only those parts of the soundbites you recorded over are erased. If you record over the beginning of a soundbite, the whole thing will not disappear; instead, the portion recorded over is replaced.

Of course, the old audio still exists in the old sound files, should you want to revert back to them, but as far as audio tracks are concerned, they now work just like tape.

UNDOING RECORD

Undoing audio recording now moves the takefile into the trash. If you then do another undoable action, the takefile is deleted. Thus, you can undo and redo, but you don't need to worry about your disk filling up with unwanted takes.

LOOPS AND MEMORY-CYCLE

Loops and the Memory-cycle feature now also treat audio tracks just like tape. You can set the cycle start and end points in the middle of soundbites, or create loops events in the middle of soundbites, and what you see is what you will hear.

PLAY SELECTION

The Play Selection command (command-space bar) now also treats audio tracks just like tape: what you see is what you hear.

CHAPTER 8 Bounce To Disk

OVERVIEW

Digital Performer 2.1's new *Bounce to Disk* command replaces (and far surpasses) the *Mix* command in earlier versions. Bounce to Disk does exactly as its name implies: it bounces multiple audio tracks down to a single sound file or stereo pair of sound files. Original tracks are preserved, and new audio files created during bouncing can be saved in 8, 16 or 24-bit resolution.

Bouncing allows you to play back many more tracks than you can play simultaneously on your system by mixing them down to a single track (or stereo track pair). It is especially useful for creating a final mix of a project for mastering to CD or exporting to multimedia or internet applications. Bouncing is also a great way to create a single, contiguous sound file out of a track composed of many smaller ones. And since bouncing occurs in the digital realm, no noise or sonic degradation is introduced. You can bounce as many times as you like without introducing any artifacts as a result of bouncing.

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SETTING OUTPUTS

Digital Performer can run under one of three different audio systems:

- The MOTU Audio System
- DAE (non-TDM)
- TDM (DAE with TDM)

When Digital Performer is running under DAE, it will bounce all selected tracks together, regardless of their current output assignments.

When Digital Performer is running under the MOTU Audio System or TDM, all of the tracks you wish to combine in the bounce operation must be assigned to the same output or bus pair. The Bounce operation will include everything being routed to the output pair or bus pair you choose, including sends that are bussed in from tracks assigned to other outputs. So be sure to assign all the tracks (and sends) you wish to include in the bounce to the same output pair or bus pair before bouncing.

PREVIEWING

After making the necessary output settings (if needed), bouncing to disk is a simple two step process: select any portion of one or more audio tracks and then choose Bounce to Disk from the Audio menu. The results of the bounce will sound exactly the same as what you selected, including volume/pan automation, mute/solo settings, real time MOTU Audio system effects, real time TDM effects, EQ and any other real time effects that are applied to the selected tracks. Basically, what you hear when you play the sequence back is what you will get in the resulting mixdown.

To preview the results of the bounce, solo the tracks you wish to include in the bounce and play back the sequence.

You can also use the *Play Selection* command in the Basics menu to preview the bounce command. But if you do, be aware that the Play Selection command ignores the current mute and solo settings of the selected tracks, so only select the tracks you actually want to play.

THE BOUNCE TO DISK SETTINGS

Once you've made the preparations already discussed, selected the tracks you wish to bounce, and chosen the Bounce to Disk command from the Audio menu, the Bounce to Disk dialog appears with the following options.

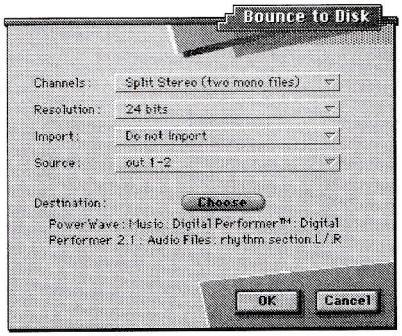

Figure 8-1: Digital Performer's new Bounce to Disk feature (in the Audio menu).

Channels

Your three choices here are *Mono*, *Split Stereo*, and *Interleaved Stereo*. (Interleaved Stereo is not available under the MOTU Audio System.)

Mono

Mono creates a single monophonic audio file. Digital Performer simply sums the left and right channels of the outputs of the source tracks, so there is a possibility that the resulting mono mix might clip, even when the source material does not. If this is the case, undo the bounce operation, adjust the levels of the source tracks and bounce again.

Split Stereo

Split Stereo creates two mono audio files that together comprise the stereo image. They share the same file name with .L and .R extensions appended to the end. Use this option if you would like to play back the results of the bounce in Digital Performer, as Digital Performer does not support the playback of interleaved stereo audio files. Also note that most other audio applications, including Digidesign Pro Tools and mastering programs like Digidesign's MasterList CD, support dual mono (split stereo) sound files.

Interleaved Stereo

This option creates a single, interleaved stereo sound file, which can be used in any application that supports interleaved stereo Sound Designer II files. Digital Performer does not support interleaved stereo sound files, so if you would like to play the results of the bounce operation, use the split stereo option discussed in the previous section. Accordingly, if you choose Interleaved Stereo, the *Import* option (described below) will not allow you to import the file into Digital Performer.

This option is not available when Digital Performer is running under the MOTU Audio System.

Resolution

For resolution, you can choose 8, 16 or 24 bits. Digital Performer can only play 16 bit audio, so if you choose 8 or 24 bits, the *Import* option below will force you to choose the *Do not import* setting.

8-bit resolution it typically applied to audio that will be used in multimedia and internet applications because it significantly reduces the size of the sound files, halving the bandwidth required to deliver the sound. When you are

bouncing down to 8-bit audio, you may want to apply dynamics processing (using the MOTU Audio System Dynamics plug-in or a TDM dynamics plug-in of your choice) to the mix to counteract the effect of halving the dynamic range that results from going to 8 bits.

16-bit resolution is the standard resolution for compact disc audio. It is also the resolution currently supported in Digital Performer.

While Digital Performer cannot currently play 24-bit audio, this resolution provides greater resolution and headroom and is used by some mastering systems.

Import

This option lets you choose what to do with the audio file(s) generated by the bounce operation. If you choose *Do not import*, the file will be created on the hard drive but it will not be imported into Digital Performer. Otherwise, you can import the audio file into the Soundbites window or into the current sequence as a new audio track (or two tracks, if you have chosen the *Split Stereo* option). If you have chosen a resolution other than 16 bits or Interleaved Stereo, you will not be allowed to choose either of these import options.

Source

If Digital Performer is running under DAE, this menu has only one setting: *All outputs*. If Digital Performer is running under TDM or the MOTU Audio System, you must indicate the output or bus pair that you wish to capture in the bounce. All tracks that are currently selected and routed to — or bussed to — the source pair you choose will be included.

Destination

This displays the hard disk location for the resulting sound file(s) created by the bounce operation. Click the *Choose* button to change it.

BOUNCING

After you've made the settings discussed above, click OK to begin the bounce. Digital Performer displays a progress window that shows the progress of the bounce operation.

If Digital Performer is running under TDM, processing occurs in real time and you'll hear the material being bounced play in real time.

If Digital Performer is running under DAE or the MOTU Audio System, processing occurs faster than real time in most situations and there is therefore no playback during bouncing. The speed of the processing, however, not only depends on how fast your computer is, it also depends on how many tracks you have selected for bouncing. If what you have selected can be played by your computer, then processing during bouncing will probably occur faster than real time. If you have selected more tracks than you can play at one time, then processing speed may not necessarily occur faster than real time.

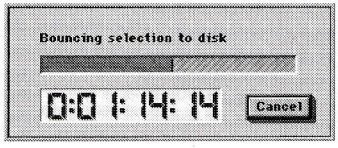

Figure 8-2: When Digital Performer is running under TDM or the MOTU Audio System, the progress window for the Bounce command looks like this. This window looks different when Digital Performer is running under DAE.

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